NATIONAL CAR BUILDER

VOLUME XIII.
NUMBER 7.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

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JULY, 1882.

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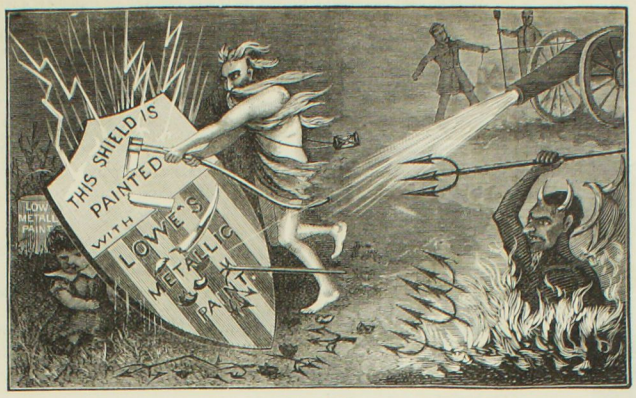

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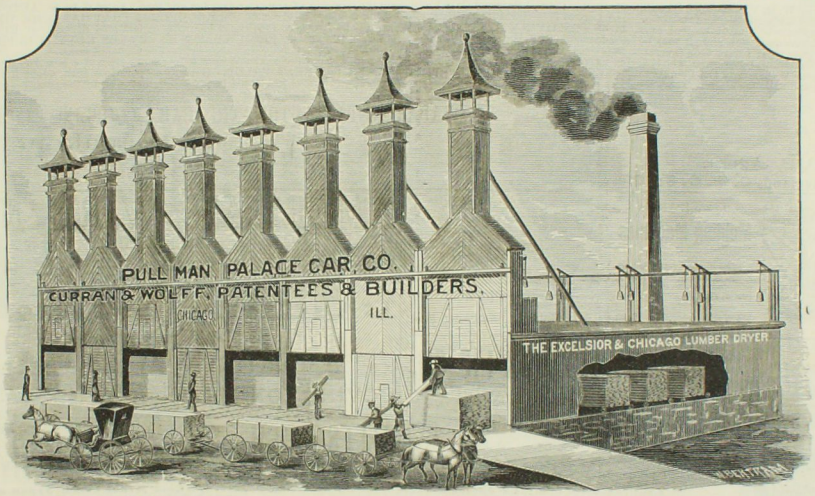

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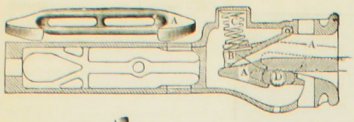
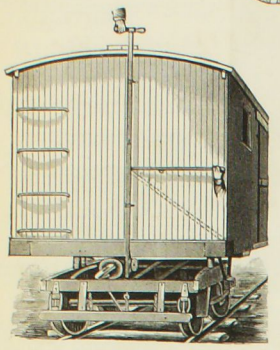


Among the many Automatic Car Couplers, few or none possess all the requisites of a perfect Coupler for freight cars. By this device we have overcome the many objections to other inventions. IT IS POSITIVELY AUTOMATIC.

Reference to the above cut shows how this Coupler is operated. The Hook-Link *A* is held in working position by the movable Lining *B* and Spring *C*. In the act of Coupling, the Hook-Link *A* slides over the Rockshaft *D* into its position.

In the act of UNCOUPLING, the Rockshaft *D* is rotated WITHOUT SLACK IN TRAIN, lifting the Hook-Link *A* up on top of the Rockshaft *D*, as shown by dotted lines, and ready to be withdrawn from DRAWHEAD. This is done from either TOP or side of car, by the use of levers, as shown in diagram, thus obviating the necessity of going between the cars.



When uncoupled it may be left so as not to couple, unless desired. Hook-Link can be elevated to an angle of forty-five degrees, to meet the variations of high and low cars. The ordinary link and pin (or in lieu the Hook-Link) can be admitted same as in ordinary Drawheads. THIS AUTOMATIC COUPLER CAN BE USED WHERE THE CONTINUOUS DRAWHEAD IS USED WITHOUT ANY ADDITIONAL EXPENSE.

This Coupler is made of the best REFINED AIR-FURNACE MALLEABLE IRON.

The HOOK-LINK and ROCKSHAFT is made of the best CAST STEEL.

Below is the test of strength of the Coupler and a few testimonials of its perfect working:

The Drawbar was held in an upright position, and the blows received on the head of the Drawbar. The Drop used weighed 1,600 pounds:

One blow at	2 feet.
One blow at	4 feet.
One blow at	6 feet.
One blow at	8 feet.
One blow at	10 feet.
One blow at	12 feet.

At the 12-foot stroke, showed a small fracture at small end.

TESTIMONIALS.

Over the signature of W. H. VANDEGRIFT, Superintendent Ohio Central Railroad Co.: I witnessed the working of your Car Coupler, and that I know it to be AUTOMATIC in Coupling, and that it uncouples without taking the slack of the train. And I say WITHOUT PREJUDICE that I think it one of THE BEST SELF-COUPLERS THAT HAS COME UNDER MY NOTICE.

Another prominent Railroad Superintendent says: IT IS POSITIVELY A SELF-COUPLER. IT IS EASILY UNCOUPLED without GIVING SLACK or RELIEVING the strain ON THE COUPLING. The ordinary link and pin may be used to couple these Drawbars, the same as common Drawbars. FROM WHAT I HAVE SEEN I SAY IT IS PRACTICABLE.

One of very recent date says: I have been favorably impressed with the device shown in cut for coupling cars. Kindly oblige me by sending model of same.

Another, from a very prominent gentleman who is deeply interested in railroads and their success, says: I have devoted some time to an examination of a new Automatic Car Coupler in charge of Mr. JOHN COUP, Agent Wapakoneta Car Coupler Company, and from my observations have no doubt of its GREAT VALUE. Railway corporations must adopt such methods as will not tend to accident in moving hand handling trains. There should be economy of life as well as money in railroading. This object would be promoted, no doubt, by the adoption of a Coupler such as shown by Mr. COUP.

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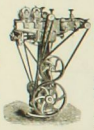

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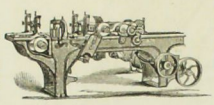

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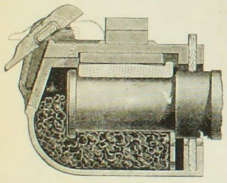

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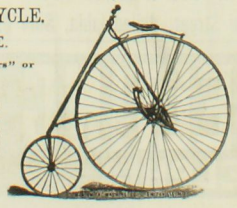

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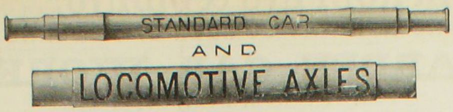

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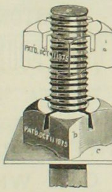

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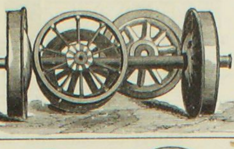

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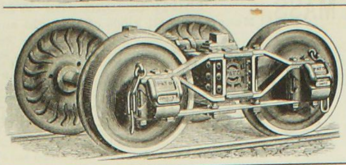

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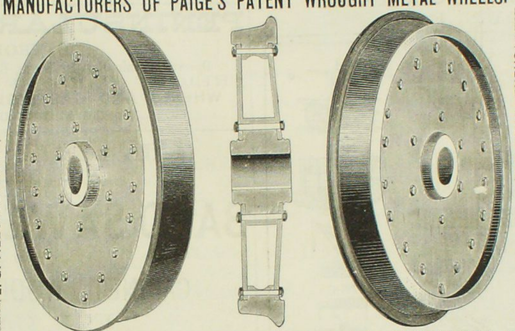

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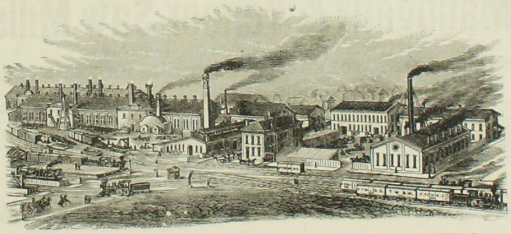

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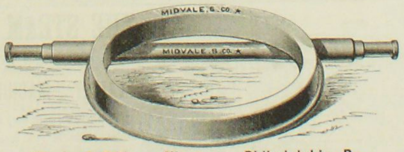

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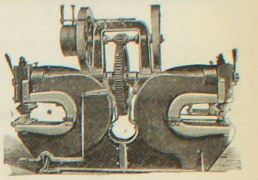

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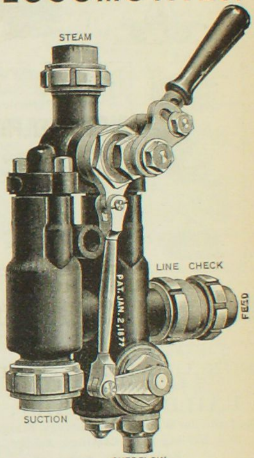

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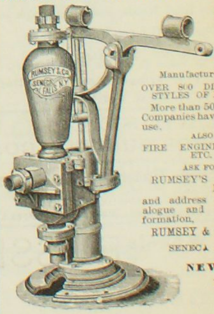

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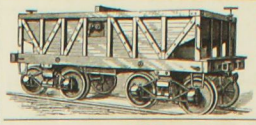

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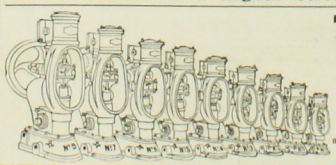

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IN THE

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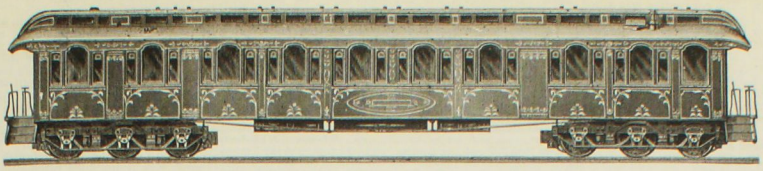


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XIII. NUMBER 7. | JULY, 1882. | SINGLE NUMBERS, TEN CENTS. $1.00 PER ANNUM.

Miscellaneous Items.

THE Schenectady Locomotive Works are finishing an order from the St. Paul, Minneapolis & Manitoba Railroad for 35 locomotives.

THE Missouri Car & Foundry Co., St. Louis, have increased their working force and are now employing between 350 and 400 men.

THE Canton, O., Car Works now employ 100 men, and are busy on a large order for box and cattle cars for the Cleveland, Akron & Columbus Railroad.

MR. R. L. BARTHLEMESS, Master Car-Builder of the Central Railroad, of Georgia, at Macon, has had a stroke of paralysis, and at last accounts was in a very critical condition.

EIGHTY thousand dollars' worth of machinery has been purchased for the Roanoke Machine & Car Works. It is expected that the works will be ready for business by the first of August.

THE L. B. Flanders Machine Works, of Philadelphia, presented to each of the members of the Master Mechanics' Association, at their recent annual convention, a handsomely-illustrated Panoramic Guide to Niagara Falls.

THE St. Charles Car Manufacturing Company, at St. Charles, Mo., have improved the capacity of their works, and can now turn out ten cars a day, every part of which, except the axles, are made at the works.

THE Savannah shops of the Central road of Georgia in 1881 built two locomotives, and are building two more this year. They have 16×24-in. cylinders. Their trucks are of a pattern that originated in these shops and have outside bearings.

A FIRE in the Bradley Car-Works, at Worcester, Mass., on the morning of June 16, destroyed the painting, upholstery and finishing shop, with four unfinished passenger cars. The loss is estimated at $33,000, on which there is a small insurance.

Two of the North River ferry boats are lighted with electricity, one of them running from Jersey City to Cortlandt street, and the other to Desbrosses street. There are four 6-burner chandeliers in each cabin, and the effect is brilliant.

THE Ward Axle, Brake & Coupling Co. is about to begin the construction of works at Monongahela, Pa., for the manufacture of a new car-coupler and patent brake, which have been tried on several railroads and have secured the approval of practical men.

THE Rochester (N. Y.) Car-Wheel Works have a capacity for turning out 125 car wheels a day. During the year ending April 1, 1882, they shipped 30,000 wheels. Passenger car wheels are warranted for one year, or 50,000 miles; and freight car wheels for three years.

THE Pullman Palace Car Company has just laid the foundations for over 500 new cottages, at Pullman, which will be finished within a few months. There are now 616 completed cottages, and 240 very nearly finished, making altogether about 1,500 controlled by the company.

A COMPANY of Pittsburg capitalists, under the style of the Webb Tool Company, are putting up a building in Allegheny City, and expect to be in operation by the first of September. They intend to manufacture twist drills and small special tools of all kinds. They are putting in the very finest machinery that is made.

THE Pintsch system of lighting for railway cars is to be introduced on the Caledonian Railway, England. Gas works are to be constructed of sufficient capacity to supply 500 carriages, and 100 are to be fitted with the light at once; also a train on the Glasgow & Southwestern road. It is said to be the best and cheapest light yet invented.

ONE incident in connection with the Car-Builders' Convention is worthy of special mention. A Pullman palace car was placed at the disposal of the western members and their wives, by A. French & Co., of Pittsburg, who also entertained the excursionists in that city, and contributed in a large measure to make their journey to and from Philadelphia a pleasant one.

THE Pardee Car & Machine Works, at Watsontown, Pa., are now engaged in building a derrick car for the New York, West Shore & Buffalo road, that is said to be the largest of the kind ever constructed. It is made entirely of iron and steel, and is rigged so it can be operated either by hand or steam power, and is capable of hoisting the heaviest cars now in use.

MR. I. B. FUTVOYE, Superintendent of the Northern Division of the Central Vermont lines, was recently presented by his friends with a gold watch, chain and seal and with a silver tray and $100 for Mrs. Futvoye. Mr. F. began on the line 25 years ago as a chainman in the engineer corps, and has been with the road ever since, gradually rising to his present position.

THE Jacksonville Car Co., at Jacksonville, Ill., has called a meeting of its creditors. The liabilities are $140,000, and it is thought that everything can be paid in full, if the creditors agree to an extension. The present embarrassment is in consequence of the canceling of several orders and the refusal of a Texas company to take a lot of cars which are now nearly or quite finished.

MR. W. R. DAVENPORT, of the Erie Car Works, exhibited at the recent Car-Builders' Convention specimens of Southern yellow pine, and Norway pine which had been tested in the United States' standard testing machine, and also in a Thurston torsion testing machine. The experiments had shown, he said, that the Norway pine was nearly 30 per cent. stronger than the Southern pine.

A SPECIAL dispatch of the Associated Press from Milwaukee to the Chicago *Tribune* of a recent date says: "The Chicago, Milwaukee & St. Paul Railway Company has completed a contract with the Allen Paper Car Wheel Company, of New York, for a supply of wheels for all its parlor, sleeping and dining coaches. It is the intention to introduce these wheels generally upon the road, outside of freight cars."

A SPECIAL train, with Wm. H. Vanderbilt on board, and running at the rate of a mile a minute, was recently brought to a standstill near Rome, N. Y., by the discovery that a brake-beam on the tender had been dragging on the ground for nearly ten miles. A Rochester paper, describing the incident, says that Mr. V. was very much sobered by the narrowness of his escape—intending no reflection, we hope, on his habitual sobriety.

MR. JOHN ORTTON, late General Master Car-Builder of the Canada Southern Railway, was presented on the occasion of his retirement from that position with an elegant silver service consisting of 21 pieces, the gift of the employés of the road. As an additional token of the appreciation of his services during the six years he has been connected with the road, a sumptuous entertainment was given him by the chief officers of the road, accompanied with cordial expressions of respect and esteem and of regret at the loss of his services. Mr. Ortton is now General Manager and Superintendent of Construction of the Portage & Westbourne Railway, with office at Portage La Prairie, Manitoba.

AT the recent meeting of the Car-Builders' Association a trial was made of the Tallman freight train brake on one of the New York Live Stock Express cars, under the auspices of a committee of the association, the chairman of which reported that the train was composed of a locomotive and tender, and one stock car, equipped with a brake, and two passenger coaches. Several stops were made, which were quite satisfactory to those who availed themselves of the opportunity to witness the same, one of them resulting as follows, brakers being supplied by the engineer to the driver sufficient to set the brakes on the stock car; speed, 25 miles per hour; stopping distance, 300 feet.

A TRIAL was recently made at Newton, Mass., of the United States Car Company's screw lever dump and coal car. The car rested on a trestle in the coal-yard of Albert Brackett & Co., and contained 16 tons of coal, the whole of which was discharged in 30 seconds from the time the first movement was made towards unloading the car. The car was mounted on four-wheel trucks, and the exhibition of its dumping capacity was witnessed by a large number of railroad men and others identified with the mercantile and mechanical interests of Boston and vicinity. These cars are now in use on the Union Pacific and other roads, and have given the greatest satisfaction.

MR. E. L. BUSHNELL, of Poughkeepsie, N. Y., has patented a new style of spring for car seats seat backs, berths and mattresses, the demand for which is large and constantly increasing. He has also patented a new style of seat frame, without side rails, and a new kind of edge spring and rods. These inventions enable him to produce a seat with a straight, strong and durable double-spring edge, obviating the unpleasant feature of front and back rails. The springs come out the full width of the seat on each side; and in making up the lower berth with two seats and backs, there is no hard ridge in the center where the two edges come together, or where the backs and seats meet. The frame and upholstering cost considerably less than the old style of frame with side rails.

SKITVILLE is a place somewhere on the line of the Texas & Pacific Railroad. Evidently it is not a very populous town, but it has a newspaper with an editor who dares to assert the rights of his fellow citizens. He writes: "This is the last time we shall allude to the persistent omission to stop at this town of the trains on the Texas & Pacific. The old excuse of the conductors that they wouldn't know Skitville if they were to see it appears too thin in the face of the fact that this morning we personally planted a large painted stake beside the track, which could be readily seen by the engineer for a distance of half a mile. This evening a nail will be driven in said stake and McClue's stable lantern hung thereon. If the night express also ignores this signal it will be time for the American people to fully understand the malice of this infamous blow leveled at the prosperity of this growing metropolis by a bloated and cowardly monopoly."

BOWERS, DURE & Co., of Wilmington, Del., have recently completed six handsome passenger cars for the Lehigh Valley Railroad Co. They are of the Pennsylvania Railroad standard pattern, the interior is finished in ash and cherry, and the decorative work is in Eastlake design. The windows are of plate glass, and have double blinds. The basket racks are of the Ely pattern. The seats and seat backs are of the Hale & Kilburn patent, and are upholstered in crimson plush. Each car is lighted with three double-burner bronze chandeliers. The outside is painted a light olive color with gold and black striping. The firm is also building a number of cars for the Manhattan Elevated road, which will be similar in their construction and finish to those now running on the road. They will have Eames vacuum brakes, Allen paper wheels and A. French & Co.'s springs. The firm has just completed 20 passenger cars of the Pennsylvania pattern for the Long Island Railroad.

THE new shops of the Ensign Manufacturing Co., at Huntington, W. Va., are rapidly approaching completion and are already turning out several cars a day. The new foundry is 70×130ft. It will be devoted exclusively to car-wheels, and has a capacity of 160 per day. The wood-working shop is 100×208 ft., the machine and blacksmith shop, 88×240 ft.; and the erecting shop, 100×200 ft. The new axle shop, 69×90 ft., is supplied with 2 Watts' steam helve hammers of 2,000 lbs. power, built by the South Boston Iron Co., and it will be able to make 40 axles a day. The shops are fully equipped with $75,000 worth of the latest and best machinery of every kind for turning out cars with the greatest possible economy of time and labor, and when the axle shop and foundry are in complete working order, the company will be able to employ 500 men and turn out over 15 cars a day. They are now employing over 250 men. The officers of the company are Hon. W. H. Barnum, President; E. Ensign, Secretary and Treasurer; F. E. Canda (late of F. E. Canda & Co., car-builders and contractors, Chicago, Ill.), General Manager; and Richard Woods, Superintendent.

Master Car-Builders' Association.

SIXTEENTH ANNUAL CONVENTION.

The sixteenth annual convention of the Association was held at the Continental Hotel, in Philadelphia, commencing on Tuesday, June 13. The convention was called to order by the President, Leander Garey, of the New York Central & Hudson River Railroad.

The following members were present:

Adams, F. D., Boston & Albany.
Allen, A. J., Ind., Bloomington & Western.
Aylesbury, Tho., Kan. City, St. Jo. & C. Bluff.
Bissell, J. A., late Pullman Car Co.
Blackall, R. C., Delaware & Hudson Canal.
Byan, H. S., Chicago & Iowa.
Burchard, C. H., New York Central & Hudson River.
Bushnell, R. W., Burlington, C. Rapids & Northern.
Carter, E. D., Terre Haute & Indianapolis.
Cooper, H. L., Lake Erie & Western.
Coulter, J. P., Ohio & Mississippi.
Davenport, W. R., Erie Car Works.
Demarest, G. W., Northern Central.
Doran, J. E., Boston & Albany.
Ford, M. P., Pittsburg, Cincinnati & St. Louis.
Forney, M. N., *Railroad Gazette*.
Frederick, T. W., New York, West Shore & Buffalo.
Fry, Howard, New York, West Shore & Buffalo.
Garey, C. E., New York Central & H. River.
Garey, L., New York Central & H. River.
Gore, C. E., Lafayette Car Works.
Gordon, Jno. A., Union Pacific.
Griffith, S., Continuous Draw-Bar Co.
Hackney, Geo., Atchison, Topeka & Santa Fe.
Hackett, Geo., Central of New Jersey.
Hayes, S. J., Illinois Central.
Hemphill, R. H., Wabash, St. Louis & Pacific.
Hildrup, W. T., Harrisburg Car Co.
Hill, J. B., Manhattan Elevated.
Hindekoper, H. S., Champaign, Havana & Western.
Hodge, John, Missouri Pacific.
Hofecker, W. L., Pittsburg & Western.
Hoit, D., New York Central & H. River.
Hollister, J. D., Savannah, Florida & Western.
Holtz, David, Western Maryland.
Hovey, J. P., Rochester & Pittsburg.
Hopkins, D. A., 113 Liberty street, N. Y.
Kirby, John, Lake Shore & Michigan Southern.
Kirby, T. B., Lake Shore & Michigan Southern.
Leighton, J. T., Continuous Draw-Bar Co.
Lentz, Jno. S., Lehigh Valley.
Levan, Jno. P., Pennsylvania.
McDevitt, B., Chicago, West Division Street R'y.
McPherson, R., Flint & Pere Marquette.
McWood, Wm., Grand Trunk.
McGee, Jas., Houston & Texas Central.
Marden, J. W., Fitchburg.
Martin, W. H., Gulf, Colorado & Santa Fe.
Mileham, J. N., New York, Lake Erie & Western.
Miller, Robert, Michigan Central.
Minshull, E., New York, Ontario & Western.
Nalls, J. T., Virginia Midland.
Olmstead, E. A., New York Central & Hudson River.
Packard, L., Baltimore & Ohio.
Paige, W. H., Paige Wrought Iron Car Wheel Co.
Pendleton, M. M., Seaboard & Roanoke.
Pratt, E. E., New York & New England.
Pullman, A. B., Pullman Palace Car Co.
Raymond, J. H., Western Railroad Association.
Rice, W. B., Chicago, St. Paul, Minneapolis & Omaha.
Richardson, D. C., Boston & Maine.
Smith, C. A., Union Tank Line.
Smith, Peter, New York Central & Hudson River.
Snow, W. B., Illinois Central.
Sylvester, D. L., W. C. Allison & Sons.
Taylor, G. M., Cleveland, Mt. Vernon & Columbus.
Townsend, Joseph, Missouri Pacific.
Turreff, W. F., Cleve., Col., Cin. & Ind.
Van Houten, I. W., Pennsylvania.
Verbryck, B. K., Chicago, Rock Island & Pacific.
Warren, B., Indianapolis, Bloomington & Western.
Watrous, Geo. C., Detroit, Lansing & Northern.
Wickes, J. H., Merch. Dispatch Transp. Co.
Wiers, J. H. F., Toledo, Delphos & Burlington.
Wilder, F. M., New York, Lake Erie & Western.

ADDRESS OF PRESIDENT GAREY.

Gentlemen of the Convention: I am happy to welcome you this morning at the annual gathering of the members of the Master Car-Builders' Association. Sixteen years ago, a few master car-builders, drawn together by mutual interest and realizing the necessity of a more definite understanding of what the condition of cars should be to pass interchange points and of some rule by which inspectors could be governed and settlements made for foreign cars repaired or destroyed, met at Altoona, in this state (after holding several informal meetings), and organized the Master Car-Builders' Association. The association is and always has been a voluntary one, receiving no financial assistance from the railroads in whose interest all our meetings are held. Our recommendations as a body are not binding upon railroad companies, which I consider one of the strongest points in our constitution, and should not be tampered with; for while railroad managers would not hesitate to send a representative to a meeting of adepts to discuss and determine as to what in their judgment would be for the greatest benefit to adopt as standards in car construction, and recommend the same to their superior officers for final action, not one manager of a railroad could be induced to send a delegate to any meeting and be bound by what such representatives in a body might determine should be standards of any description.

The proposed amendment to the constitution will come before you again for further consideration and final action. It is intended to more directly interest railroad companies by introducing representative members who may be delegated by such companies, and who shall have a voice in the recommendations in proportion to their interest involved. A representative member would be in a position to present the proceedings of the meetings to his superior officers, thereby bringing directly before the proper authorities any recommendations that may be determined upon. You will observe that active and associate members would retain all the privileges they now enjoy.

By request, a committee of three master car-builders was appointed to confer with a like committee of master mechanics and report as to the advisability of holding the annual meetings of the two associations at the same time and place. Without giving the proposition careful consideration there appear to be serious objections. However, if a satisfactory arrangement could be made as to the hours of session, it would permit members to attend the meetings of both associations during the same week, which would lead to a larger attendance and more interesting meetings.

The present defective and expensive devices for coupling freight cars have been in use for many years without any marked improvement upon the old link and pin system. Although thousands of patents have been granted for improved draw bars and automatic couplers, many of them with some merit, yet none having sufficient advantages to places them in general use. The necessity for improvement in this direction is of so much importance that our legislators have been called upon to investigate the matter with a view to passing laws compelling railroads to make some provision to prevent placing train men in danger of being crushed or maimed while coupling cars. Whenever it has been shown that railroad companies could better protect the lives of passengers or employés by the use of practical improvements, there has been no necessity for legislation or any pressure other than the plain facts to place such improvements in use. Although most of the injuries to train men are the result of carelessness on their part, it is none the less your duty to recommend some method of coupling cars that will remove the necessity for train men to stand between them while coupling, and I hope some practical device will be presented and recommended during this convention in the shape of an automatic car coupler dispensing with the use of loose links and pins, and at the same time admit of their use when needed.

There is no established rule that I am aware of for seating on axles with reference to the lateral play between rails and flanges. It is not unusual to find each pair of wheels under a car set by a different gauge, varying from ¼ to ⅓ an inch; while the form, height and thickness of wheel flanges and width of wheel tread are left to the various foundry superintendents to determine, and the so-called 33-inch wheels are from ⅓ to 1¼ inches under size. I would ask you to recommend the diameter which chill molds should have, to insure 33-inch wheels, and establish the size of wheel, form of flange and width of tread.

The rules governing the condition of and repairs to freight cars for interchange traffic to come before you for revision should be carefully considered and so perfected that freight in transit may pass interchange points with as little delay as possible. Freight is often delayed and in many cases transferred when the cost of repairs necessary to put cars in condition to proceed on their journey safely would not exceed one-half the cost of transferring their loads; if some satisfactory arrangement could be made to admit of the necessary repairs to loaded cars in transit, charging the owners with cost of the same, it would greatly facilitate the movement of freight at times when every car should be utilized to its fullest extent, thereby increasing the capacity of our roads in their time of need.

The Committee on Train Brakes made the following report:

TRAIN BRAKES FOR FREIGHT CARS.

To the Master Car-Builders' Association:

The Committee on Train Brakes for Freight Cars, continued from last year, submit the following report:

From replies received to circulars sent out, when the Committee was first appointed in 1876, it was evident that there was no automatic brake in existence adapted to freight service, and, while the practicability of such a brake was questioned by some its desirability was conceded by all. Consequently your Committee, in their first annual report, set forth certain stipulations which in their judgment should be embodied in any device to adapt it to the peculiar conditions of freight traffic, and although little was accomplished for some time, still very satisfactory progress has been made in the last three years.

Very few new devices have been produced during the last year, and some of those previously reported may be said to be in a progressive state.

The Reed train brake has been considerably simplified in construction during the past year, and is doing good work on the Harlem Division, where it has been in operation for nearly two years.

The American Brake Co. report having their train brake in successful operation on 500 cars on the St. Louis & San Francisco Railway, and that for cheapness, efficiency and durability is all they claim for it. Reports from the above railroad company give some 500 cars equipped with this brake running over a period of some fifteen months, and in that time several bad wrecks have been avoided by its use. The weight of the brake applied to one truck is 140 pounds per car, and the first cost $11.75, while the annual cost of repair is very small.

The Tallman train brake, which has been working successfully on the Harlem Division for nearly two years, is also running on ten cars of the New York Live Stock Express Co. between Chicago and New York. At two trials of this brake in February on the Central Railroad of New Jersey excellent stops were made, some of them as follows:

Speed 20 miles per hour, down grade, stopped in 360 feet in 18 seconds; speed 25 miles per hour, down grade, stopped in 450 feet in 22 seconds; speed 35 miles per hour, down grade, 23 feet to the mile, stopped in 1,080 feet. A trial of this brake on the Chicago, Rock Island & Pacific Railroad proved quite satisfactory. Exact data not given.

The Pennsylvania Railroad has some 75 stock cars equipped with the Westinghouse air brake, but are not yet satisfied in regard to its practicability for freight service.

There have been two new brakes brought out since our last annual meeting, which your committee think worthy of mention. The Fuller & Salvadge brake is in successful operation on a construction train on the Grand Trunk Railway. This brake is independent on each car, being operated by compression of draw-bar. The cost is about $20 per car.

Also the Stow brake, which is of peculiar construction, requiring neither air, steam, compression or electricity to operate it, for which the following is claimed: A short chain between the cars sets the brake automatically on all cars equipped with it, which are connected together. Where a train breaks in two, and should the brake be out of order on one or more cars, it does not effect the efficiency of the others, each car taking care of its own slack chain while transmitting the power unimpaired to its neighbor, and when the brake is applied, and the train brought to a stop, the power is automatically stored up on each car ready for the next stop.

Although this brake uses a connection between the cars, it is not open to the more serious objections urged against such a system; for example, there is no intricate machinery to get out of order, lost or stolen, while cars are lying idle on side track, and it is not necessary that all the cars in a train should be equipped with it, or placed at one or both ends of the train, each car brake being complete in itself, and can be instantly applied and released by any trainman on any one of as many of such cars as are coupled together in any part of the train, while the cars next the tender would be under control of engineer. Arrangements have been made for putting a number of these brakes in practical operation, where their utility can be tested.

In conclusion your Committee would say, that while as much progress as was desired has not been made during the past year, still, out of the various devices in successful operation, in their opinion, *other* companies might well emulate the example of the St. Louis & San Francisco Railway, namely: Make a selection and apply independent train brakes to their freight cars with great profit, thereby increasing dividends, while decreasing the cost of transportation; and would ask that a new committee be appointed.

C. E. GAREY, Chairman,
GEO. HACKETT,
L. GAREY,
Committee.

MR. KIRBY said that when freight trains broke in two, it usually occurred either in climbing a grade or on the summit, and when the two parts of the train came together again, the most damage was done. It was in such cases that a train brake was very much needed. He wanted to know if any of the brakes referred to by the committee would prevent this.

MR. FORD wanted to hear from some of the members in reference to the working of the brakes on the respective roads on which they had been tried, and especially in regard to the performance of the Westinghouse freight train brake on the Pennsylvania Railroad.

MR. C. E. GAREY said that all the brakes mentioned in the report, with two exceptions, operated by the compression of the draw-bar, and when a train breaks in two, a brakeman anywhere on the rear section of the train, in applying the brakes to the car he is on, applies them to all the cars in the rear of that car. The exceptional brakes referred to were the Westinghouse and Stow brakes. The former was giving good satisfaction on the Pennsylvania road, and the latter had not yet been fully tested. He would further say that no brake operating by compression on each car independently of the others can be applied in the way suggested by Mr. Kirby without a concussion between the cars.

A committee was then appointed to make arrangements for a trial of the Tallman brake.

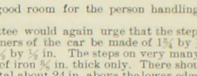
The report of the committee on the cause of accidents to train men was then called for.

ACCIDENTS TO TRAINMEN.

To the Master Car-Builders' Association:

This committee made a full report to the Association in convention in Chicago. We have discovered nothing new beside what was recommended in that report. The subject of whether two dead-blocks at the ends of freight cars over the draw-bars is safer for the men than one block is demanding our attention. This committee recommend that this subject of dead-woods receive due attention. We are aware that the two systems, viz., single and double dead-woods, without any uniformity as to the distance between the blocks, is a source of injury to men. We find that the distance between these dead-blocks varies from 16 in. to 30 in. A single block only 26 in. long will pass between the double blocks and perhaps cause injury.

To reconcile this difference your committee would recommend that those whose preference is for double dead-block shall make the overall of the two blocks not more than 30 in., each block to be 10 in. long by 8 in. wide. Those who prefer the single dead-blocks must make them not less than 28 in. long, 7 in. thick, 8 in. face. To hold the drawbars in the present location, so as not to increase the length of train, cut the dead-wood out in the middle, thus:



That gives good room for the person handling the coupling pin.

This committee would again urge that the steps bolted to the sills at two corners of the car be made of 1¾ by ½ in. iron, not lighter than 1½ by ½ in. The steps on very many new freight cars are made of iron ⅜ in. thick only. There should be a handle placed horizontal about 24 in. above the lower edge of the sills at the corner, where the steps are located. A handle also should fastened on each end at the opposite corner from the ladder. This is to hold to by the person coupling or uncoupling; should he stumble, it furnishes him a support and enables him to recover himself. Yardmen esteem this handle very highly.

JOHN KIRBY,
J. H. H. WIERS,
Committee.

MR. KIRBY, the chairman of the committee, stated that something more would be reported by another committee in regard to dead-wood blocks. The distance between the double blocks varied, so that the single blocks ordinarily used would go between them; and he thought, therefore, that those who favored double blocks should be heard in order to bring such blocks nearer together, and prevent the single blocks from going between them.

The committee on the subject of standard draw-bars and draw-springs made the following report:

DRAW-BARS AND DRAW-SPRINGS.

To the Master Car-Builders' Association:

Your Committee on Draw-Bars and Draw-Springs having been requested by the meeting held at New York in June, 1881, to report whether a pair of dead-blocks, or a single buffer-block gives the greater security to trainmen, and protection to freight cars, and to recommend dimensions for each, beg to report as follows:

The single dead-woods, when constructed in accordance with the plans recommended by this committee at Chicago, in June, 1879, viz., 26 inches long, 6 inches thick and as deep as the end sills, would undoubtedly give the greater security to trainmen, as there would be 24 inches between the cars when the draw-springs are compressed 3 inches each, and 16 inches if draw-heads are driven back flush with ends of draught timbers. Dead-woods arranged in this manner, it appears to your committee, would be safer than double dead-blocks, unless there should be some way devised to guide the link and pin, without the necessity of trainmen reaching over or under the dead-blocks to couple the cars.

We are of the opinion that double dead-blocks would be a greater protection to freight cars than the single dead-woods, the draw-springs and attachments would be quite safe from injury, provided the dead-blocks were put on uniformly as to distance between them, but in coupling a car with double dead-blocks, wide enough apart to admit the common single dead-woods between them, would be dangerous both to train men and to cars.

Your committee see no good reason to change their views as to the draw-bar attachments, including the dead-woods, recommended in report made in Chicago in 1879.

We would therefore again recommend for a standard the attachments, including dead-woods, described on page 92 of the report of the proceedings of the thirteenth annual convention held at Chicago, June 1879, reference being had to the models furnished the association for illustration.

And as it is quite probable and nearly certain that double dead-blocks will be used quite largely for some time to come, it appears to be essential that they should be constructed with uniformity, and in such manner as to avoid danger to trainmen as much as possible. We would therefore recommend that when double dead-blocks are used they be made of cast-iron, 8 inches square on the face and 6 inches thick, and placed 24 inches apart, center to center, giving a clear space between them of 16 inches. This would allow a lap of 5 inches on each dead-block on the 26-inch dead-wood, and make it reasonably safe for trainmen to couple cars.

W. B. SNOW,
M. CAMPBELL,
M. P. FORD,
Committee.

MR. DAVENPORT referred to the fact that the Pennsylvania and the New York, Lake Erie & Western roads both used double blocks, the former placing them far apart and the latter close together. He would like to hear the rea-

sons why these respective distances were preferred by these roads.

MR. MILEHAM, of the Erie road, said that the blocks on the cars of that road were placed 20 inches from center to center because that distance was considered safer and easier for the men, and there was fully as much strength, because they were opposite the two center sills.

MR. KIRBY said that on some roads these blocks were 17 inches apart, 8 inches wide and 5 inches up and down, and it was impossible, when the blocks were so placed, for a man to reach over or under to couple or uncouple. It kept the man's hands away so he cannot guide the link or pull the pin. On another road the blocks were 18 inches apart, and their size 8×12 inches; and on another 30 inches apart, 8 inches high and 8 inches face; and still another 33 inches between and 9 inches face. The Erie blocks were, in his judgment, the nearest right. They were 8 and 12 inches between blocks, which was all very well so long as the cars were on the home road, but that day had gone by.

A call was made for some one to explain why the blocks were placed so far apart on the cars of the Pennsylvania road, but no representative of the road responding, Mr. Snow said that the reason most probably was that the blocks were so placed at first, and the practice had been adhered to ever since.

THE PRESIDENT said the question as between double and single buffers should have been decided years ago, and it was now incumbent upon members to give sufficient reasons for preferring the one or the other as a uniform standard.

MR. FORD said that when a car with a double block was coupled with one having a single block, the draw-bar had to take the brunt of the blow, especially on the single block car. With a single block the draw-heads must project 7 or 8 inches beyond the block, and must be driven in that much before the blocks will meet. The projection of the draw-heads with the double blocks was only about 2 inches. The single blocks should be long enough to strike both the double blocks, and not go between them. The double blocks were a protection to the draw-bars and the springs, because the bars only needed to be compressed 2 or 2½ inches before they were relieved by the blocks, and then there remained from 12 to 14 inches of space for a man to stand between the end-sills. The trouble was that the double and single block cars, when on foreign roads, get mixed together. We were talking about loading cars with 30 tons, putting them into long trains, and increasing the speed, while little additional strength was given to the draw-bar rigging. He believed that double blocks were absolutely necessary for the protection of the cars. He was not prepared to say that they were very much more dangerous where the men are accustomed to them; but when the two kinds of blocks were in the same train, they were certainly very dangerous to handle, for the reason that the draw-bars must necessarily take the strain.

MR. FORNEY referred to the fact that about half the freight car equipment of the country was made with single blocks and half with double blocks. It was therefore unreasonable to expect that either method would be entirely abandoned in order to give place to the other; and the only way out of the difficulty would seem to be for the association to recommend a single block of such length, and double blocks of such dimensions, that they will not interlock on coming together. This would not expose the men to any additional danger, and the roads could adopt the one or the other, as they might be disposed. He referred to the action of some of the State Legislatures in respect to the matter, and thought it was absolutely necessary for the association to recommend standards for both kinds of blocks.

MR. DAVENPORT called attention to the recommendation of the committee as to sizes and dimensions at the close of the report, and said it was a reiteration of the recommendation made by the Association at Chicago, in 1879.

MR. KIRBY wanted members to speak out on this subject. There was no use in bringing up the matter year after year, and leave it undecided to lie dormant another year.

MR. BISSELL favored the double blocks. Good reasons had been given for preferring them, but no satisfactory reason had been given for using single blocks. He thought the Association was far more competent to decide the matter than the State Legislatures were.

MR. KIRBY said that the trouble with the double blocks on many roads was that they were too far apart. Bring them nearer together, and almost any of the single blocks would strike them both instead of going between. And as for protection to the car, his idea was to put more springs or heavier ones back of the draw-bars. The length and weight of trains had been increased, and yet we were using single draw-springs the same as we did 25 years ago. He had 100 cars running with double draft springs. They had been on the road from three to five years, and not one of them had broken.

MR. DAVENPORT said there were two parties on this question. One believed in receiving the ultimate blow on the car, and the other on the draw-head and spring. One wanted to save the car body from the concussion which would disintegrate and destroy, and the other wanted to save the draw-bars and springs, which cost a good deal of money, but not as much as the car. It was idle to expect to settle the matter at this time. The report of the committee recognizes the two systems, and the need of bringing them into such relations with each other as will save the men. He thought the Pennsylvania Railroad Co. would from this consideration consent to lessen the distance between the blocks as the Erie road had done. He moved that the recommendation of the committee be adopted.

MR. RAYMOND moved to amend the report by striking out "24 inches apart from center to center," and inserting "28 inches apart out to out," which would make it conform to the dimensions in Mr. Kirby's report for the single block. He was heartily in favor of the single block, and believed that unless an automatic coupler was adopted within the next few years double blocks would have to be discarded by the requirements of State legislation. The safety of the men required the use of single blocks, and he did not believe that any body could make a very long or strong argument in favor of saving the car instead of life and limb.

MR. C. A. SMITH was of the impression that a large number of cars had buffers that were more than 28 inches apart.

MR. W. G. RAOUL, Vice-President and General Manager of the Southwestern Railroad of Georgia, was introduced by Mr. Raymond, and said that the single block was the safest for the men, and he thought that should be the controlling consideration in whatever was adopted. The double blocks would not be discarded by the roads that were using them. There should be a recommendation for the placing of the double block. The State legislatures were going to act on the subject, and when one acted the others would act. If one should require the double block to be used, the rest would follow suit, and we may thus be saddled with a system that is not the safest. If the single block was the safest the association should say so, and then recommend dimensions for the double block that would harmonize with the single one, and vice versa.

MR. FORNEY was not so sure that the single blocks were the safest. His opinions heretofore expressed had been somewhat shaken by a perusal of some correspondence on the subject between the officers of the Pennsylvania Railroad and its leased lines, in which a large proportion of the opinions favored the double blocks as the safest. He moved that the committee on the subject be requested to submit the dimensions agreed upon as a standard to the different railroad companies, and report the result to the next meeting of the association.

After some further discussion, the amendment proposed by Mr. Raymond and the motion of Mr. Forney, were both disagreed to. Then followed a good deal of conversation in which the dimensions recommended by the two committees—the "Kirby" committee and the "Snow" committee—got a good deal mixed in consequence of the various propositions to amend the respective recommendations for single and double blocks. The upshot of the matter was the final adoption of the following specifications:

Double blocks should be 8 inches square on the face and 6 inches thick, and be placed 23 inches apart, from center to center, giving a clear space between them of 14 inches. Single blocks should be not less than 28 inches long, 7 inches thick and 8 inches face.

It was also decided that the bottom of the blocks, whether single or double, should be 36 inches above the top of the rails.

CARRYING CAPACITY OF FREIGHT CARS.

The Committee on this subject, after referring to the circular issued by them on the 30th of March, and which will be found in the May number of the CAR-BUILDER, report the following replies to the questions contained in the circular. About 100 replies were received, one-third of which were from managers and superintendents.

Q. 1. Have you found any difference in the wear or breakage of wheels under 10 or 20-ton cars?

36 reply that they have found no difference in wear or breakage; 2 have found a difference in both; 7 have found no difference, but expect wheels to wear out faster; 8 have found a slight difference in wear but no more breakage; 2 say wheels under 20-ton cars make as much mileage as under 10-ton cars; 3 say more wheels break under 20-ton cars than under 10 ton cars.

Q. 2. Are the wheels under your 20-ton cars of greater weight than under 10-ton cars. If not, do you think they should be?

27 say of no greater weight, and need not be; 3 say a first-class 500-lb. wheel is heavy enough for 20-ton cars; 10 say wheels for 20-ton cars should weigh from 525 to 575 lbs.; 5 say they should be heavier, as cars are often loaded above their marked carrying capacity; 5 say they are heavier and should be.

Q. 3. Have you found any difference in the wear of journal bearings upon 10 and 20-ton cars?

30 have found no difference in wear; 10 have found a slight difference in wear; 7 have found them to wear faster; 7 say the wear must be greater; 1 says the wear must be greater and the journals should be larger; 10 say the difference is in favor of 20-ton cars over 10-ton with small journals.

Q. 4. Have you found that journals under 20-ton cars wear out faster than under 10-ton cars?

28 have found no difference in the wear of journals; 9 say they do wear faster; 3 say a slight difference; 4 say the wear must be greater.

Q. 5. Have you had more hot boxes under 20-ton cars than under 10-ton cars?

42 answer no; 7 say they have no hot boxes with Master Car-Builders' journals; 1 says hot boxes point that way.

Q. 6. Have you found it necessary to use more expensive oil upon 20-ton than under 10-ton cars?

48 use the same quality of oil on all cars; 7 say they use a better quality of oil.

Q. 7. Have repairs to draw-bars and fixtures and other repairs under 20-ton cars been greater than to 10-ton cars.

2 say they have not, but expect less repair per ton per mile; 43 say they have not been greater; 5 say repairs have been slightly greater; 1 says repairs depend upon length of trains; 1 says they are greater on account of heavier engines.

Q. 8. Do the bodies of 20-ton cars show greater deflection from their original lines than 10-ton cars?

47 say they do not; 3 say a slight difference; many say no perceptible difference upon cars well built.

Q. 9. Have the 20-ton cars increased the repairs to road bed, rails or bridges?

2 say no, as less wheels pass over the track per ton per mile; 11 think the repairs must be greater; 14 answer no; 19 say they do not know; 4 say probably slightly; 4 say not perceptibly.

Q. 10. In your opinion can freight cars of 34 and 40 feet in length be run as safely as shorter cars?

29 say there is no doubt about it; 5 say they cannot; 5 prefer shorter cars; 2 cannot answer the question; 2 say 30-foot cars are long enough; 2 say 32-foot cars are long enough; 5 say 34-foot cars are long enough; 2 say 35-foot cars are long enough; 1 says 40-foot cars would be easier and safer on the track.

Q. 11. In your opinion can the carrying capacity of freight cars be increased from 20 to 25 or more tons with greater economy than to carry freight in 20-ton cars?

23 have no doubt that it would be economy to increase the carrying capacity to 25 or more tons; 11 say 20 tons is load enough for 1 car; 1 says it could be increased to 30 tons; 1 says the journals could not be kept cool; 2 say by increasing the load you make less cars and trains do the same work; 2 are doubtful; 2 advised to stop at 20-ton cars for the present.

Q. 12. If the carrying capacity of freight cars should be increased to 30 tons, would you recommend journals and axles to be made larger than the Master Car-Builders' standard, and that wheels be increased in weight?

29 recommend an increase in weight of wheels and size of journals; 6 recommend for 30-ton cars a 4×8 journal; 9 say there is no necessity for an increase of either; 10 would increase the weight of wheel but not size of journal; 3 would increase the size of axle.

Q. 13. Can a locomotive draw 1,000 tons of freight over your road, in 20-ton cars with greater economy than in 10-ton cars?

38 say there is no doubt about it; 3 say it can, saying nothing of less cost of cars, less repairs, etc.; 1 says it can at a moderate speed; 1 says 25 per cent. cheaper; 1 thinks 20 tons is load enough; 2 say it would make a difference of 2 trains per day over their road; 3 say it can as the train would be shorter and lighter; 1 says it can as it would take less motive power; 1 says it can, and the *point* is the number of tons of freight drawn instead of the number of cars; 1 says he cannot tell; 1 says no.

The committee say that many of the replies were only to a few of the questions, paying no attention to others; while many were simply yes or no. In the opinion of the committee, freight can be transported in 30-ton cars as safely and with greater economy than in cars of less capacity, and they would recommend that in the building of test cars of 25 or 30 tons carrying capacity, the weight of wheels be increased to 575 pounds, and that the M. C. B. standard axle, or one of a larger size, be used.

The committee consisted of Messrs. C. A. Smith, J. N. Milebam and C. E. Garey.

MR. C. A. SMITH said: When we get our heavy cars and put 30 tons into them, many people will laugh just as they did when we increased the carrying capacity from 10 tons. What could have been done in the last four years with the enormous traffic we have had, in cars of 10 tons capacity? The committee have refrained from making any particular recommendations, thinking it best for the association to take it up and discuss it, because this matter of the carrying capacity of cars is one of the greatest importance. There is nothing that we can take hold of, or that any railroad company can take hold of, that is of greater importance.

THE PRESIDENT: It is only a very short time ago that a president of a railroad company censured very severely one of the customers of the company for loading freight cars with more than 10 tons, and said to him that if he had the power he would have him tied up by his thumbs and horsewhipped.

MR. DAVENPORT: The success that has attended the carrying of 20 tons of late in cars is so far very gratifying, but do not let us conclude that therefore we have reached the end of the matter, and that it is to be all sunshine. The 20-ton cars are new. People haven't learned to load 30 tons into 20-ton cars, as they surely will after using them a few years; and the results have not been as disastrous as they will be then. We all understand, of course, that when a car is new, and everything is all right, that is one matter, but a car does not stay new, especially as there is a good deal of timber being put in cars now that rapidly deteriorates in strength by seasoning. I have gone to some expense and taken some pains to have some test pieces forwarded here to my care, which, if opportunity is given me, I will take pleasure in showing to the association. We have jumped at some conclusions that we need to consider carefully. The timber which is now being specified for cars by a good many roads as the timber of which a car should be constructed, is found to possess a very serious quality in seasoning. While it retains its appearance of strength, and while it will bear great strains, it will not bear great transverse strains. It will do very well for posts and braces, but it won't do very well for longitudinal timbers. The test as given in the books is entirely erroneous, as demonstrated by actual tests made by United States standards on transverse strains. Now, let us make haste slowly in this matter. We have won laurels enough for an ordinary lifetime. I don't want to be an old fogy, and I don't feel that I am one, but do not let us be too hasty in rushing to a 30-ton car. We know the weakness of Americans; we go like the pendulum from one extreme to another; we swing through the arc rapidly too; we suddenly find ourselves at the extreme, and with more or less humiliation we have had to take the back track. We need not be hasty in this matter. Our standard axle has shown capacity to carry 20 tons, and if they make it 25 tons, it will carry it nicely and coolly. Now, we have adopted the standard axle, and I think it has a capacity for carrying that is beyond the anticipation of its most hearty friends. Are we to have another standard axle immediately? Are we to jump from a 20-ton car to a 30-ton car? If we carefully consider what percentage of weight to a car is carried by our trunk lines, it will be possible to get 30 tons into a car, by making the car of elephantine proportions. Have you thought of how large a percentage of freight passing over your respective lines could be put in 30-ton loads into cars of the present size? I do not advocate hasty action in this matter. I say that we can carry 20 tons, and that declaration is vindicated in this report. Now, of course, we know that if we mark a car to carry 20 tons, we must expect that the first fellow who can put 25 tons in is going to do it. If we mark a car to carry 30 tons, they will put everything they can get into it, no matter whether it is pig tin, or pig lead, or pig iron. Now the result of this would be simply disastrous. Our big bridges are not intended to carry a solid line of locomotives the whole length of them. That is what you are going to put on the bridge when it is new, and the car when it is new will carry tremendously; but it will not stay new always.

MR. C. A. SMITH: In answer to Mr. Davenport's last inquiry about putting 30 tons into the cars, I would say: Into how many cars can you put 30 tons of freight, that is, of certain classes of freight? You can just as well put that freight into large cars, as you can into small ones. Of course, we understand with the 30-ton car that it is only when that class of freight that we now put into the ordinary cars is used that it will have that capacity; and I will ask Mr. Davenport how many cars has he built in former times to carry 10 tons, to which all that has been done to make them carry from 15 to 20 tons has been to alter the figures on the car side, and they would carry the increased load safely? Your cars that were 10 tons capacity are now carrying 20 tons, and carrying it safely, and all it took was a painter to change the capacity from 20,000 to 40,000 lbs.

MR. DAVENPORT: We haven't heard the end yet; it is only the beginning.

MR. SMITH: I think we should take a stand on this, either one way or the other, even if we do have to back out. I think it would be more honorable to us if we have to back out, to do so, but at any rate to express an opinion about it.

MR. C. E. GAREY: I apprehend that all that will be necessary to make the standard axle of to-day carry 30 tons will be simply to increase the size of the axle a little between the wheels to keep it from bending. I apprehend that the journal is quite sufficient to carry 20 tons, and I am proud to stand here to-day and say that I was in favor of a larger journal than 3¾ × 7 when that size was adopted. However, I think that will do for the present, and the recommendation of the committee was simply that parties build 25 or 30-ton cars in order to find out something about them before building 40-ton cars. I recollect an old car that run on our road, built to carry 10 tons and no more, and I know that car to be loaded with 19 tons—an old car almost ready to come into shop and be torn down. Now, we know very well that what has been done about increasing the carrying capacity of cars within the last 4 or 5 years has been to change the figures on the side of the car, and I think if all the members of the association will consider the recommendation of the report and the labor it has cost, they will be ready to do something about it, and express an opinion one way or the other.

MR. TOWNSEND: From the fact that we build cars to carry 20 tons, and they put 25 and 30 tons in them, it seems to me that if we build cars to carry 30 tons, they will be loaded with 40 tons. It seems to me that there

must be a limit to this carrying capacity at some time. It is a question in my mind whether our road beds and bridges are prepared for this. The Pennsylvania R. R. roadbed is in much better condition than ours are out west, and it can carry much heavier loads than we can on a small axle; but I think 20 tons is the extreme limit that we should carry. If we could load our cars with 25 tons, and no more, I would be in favor of 25 tons; but from the fact that they would put in 30 tons, I think we should stop at 20.

MR. BISSELL: But one side of this subject has been brought up so far, I believe, and that is simply the matter of dollars and cents. It seems to me that the liability to accidents to trains, hot boxes, etc., by putting in such enormous loads, must be greater than by putting in moderate loads. It seems to me that this is a very important matter, and one feature brought out by Mr. Davenport's remarks seems to me to be worthy of very grave consideration, and that is the carying of such a great weight over trestle-work.

MR. C. A. SMITH: My view of this matter is directly opposite to that entertained by Mr. Bissell. He says that the heavier the cars the greater the liability to accident. I think the more car capacity you have, the less wheels you have, the less draw-bars, the less coupling, and the shorter the trains. I think the advantage is all on the side of greater safety in every way. I believe that with a 30-ton car the middle of our axle should be increased in size to keep it from springing. There is no danger of a car breaking down if it is fairly and well built. The lumber would not break, there is nothing there that would give out, and the iron car can now be built that will carry from 30 to 40 tons, and our railroad companies are building their bridges stronger in every way, and their road beds are better. A member spoke of running a train of locomotives over a trestle. I don't know what the carrying capacity of bridges is, but I think it is five or six times greater than any load put upon them. Railroad companies are putting their bridges and road beds in such order that they will carry heavy locomotives now. It is just as easy to get as much freight in a 30-ton car as in a smaller car, if it is not heavy freight.

MR. BISSELL: Why do train despatchers place one locomotive in front and one in the rear on long trains? It is because they are afraid to let two locomotives together run over the bridges.

MR. RAYMOND: If the carrying of this larger tonnage in freight cars is a matter of economy and safety, I do not apprehend that the strength of bridges or trestle-work, will stand in the way of it; if there is economy and safety in so doing, let us rebuild the bridges; that is what will be done if it is necessary. I understand that it is the test of every bridge that it shall bear a train of locomotives to run over it after deflecting.

MR. FORNEY: Not exactly; any load would deflect a bridge, but not beyond the elastic limit. The plan is to take a train of the heaviest locomotives, and then allow a factor of four or five of safety. That is, a bridge is allowed four or five times more strength than would break it down with the heaviest locomotives.

MR. RAYMOND: This discussion is a valuable one, and one to be continued for a year or two. This is a valuable report, but not such as a man should base a conclusion on, or on which any manager could base any action. I make these remarks now with the idea of turning the discussion a little. The first question is as to the bearing of the journal. There are certain railroad companies who claim to have no hot boxes, and yet I will guarantee to go on their roads and find a hot box within 48 hours. I had the appointment some years ago of a very able committee on bearings; two of that committee who conducted the tests were general officers of railroads, and one of them said he never had a hot box on his road. My recollection is, that there were 48 bearings tested in the first of the series of tests carried on by the committee, and it was repeated to me from that general officer, especially, that on his road there were just as many hot boxes as on the other roads put together, and I have lost confidence in the information a man has received who says that he has no hot boxes on his road. I don't hesitate further to say, if you take the dust-guard, the box lid, the bearing, and the journal, and all those elements put together, and a more shapeless and unmechanical arrangement is not in use to-day in any blacksmith shop as is in use on the railroads of the country. Every thing depends on weight. The question as to how much you can put on that journal, and how you can put it there without disorganizing the thing, is the question. Mr. Davenport can build a car that can carry 50 tons if he wants to, but the keynote to this expression, as I saw it, is in the box. In answer to the first question propounded in this committee circular, 36 have found no difference in wear or breakage; 27 say no greater weight of wheels required; 30 have found no difference in that way; 28 have found no difference in the wear of the journal; 58 in answer to the fifth question say they have not had any more hot boxes with the increasing capacity. And yet 29, evidently the same men, say they would recommend an increase in the weight of the wheels and the size of the journals. Why do those 29 men say so, when they have said in the former part of this report that it makes no difference in the wear or breakage. These same 29 men, or at least 20 of them, say that every thing is all right just as it is, with the present standard journal, present weight of wheel, etc., to carry 30 tons; and yet they say it would no doubt be economy to increase the carrying capacity to 25 or more tons. I will make this additional suggestion in answer to Mr. Smith's remarks, that I certainly do not think that this convention is in a position to-day to pass any resolution, or make any recommendation with reference to this question. The discussion is, and will of course be, a very valuable one, but this convention is most certainly not in a position to solve this question in a day, or to make an intelligent and final representation in the premises on any point.

MR. LEANDER GAREY: There are several things to be taken into consideration in regard to the increase of tonnage for cars. One is the apparently progressive movement in increasing the speed of freight trains. Freight trains, nominally, are to-day running 12 or 12½ miles per hour. Now, if this speed were increased to 25 miles it would double the capacity of the road if the terminal facilities were sufficient. When you run 25 or 30 miles an hour, as I apprehend freight trains will run within the next five years, you will find that the present journals will not carry the load. The average speed on the New York Central road is 20 miles an hour. It has been increased from 12 to 20 at my suggestion. I don't think there is any difficulty in running freight trains at 30 or even 30 miles an hour, if they can be kept under the control of the trainmen, and I think the repairs per mile run will be decreased in proportion to the increase of speed up to 30 miles. I think the speed will be increased, and this will increase the capacity of your road, and I am in favor of leaving the whole subject just as it is, without recommending anything as to the capacity or size of cars. Our officers were very careful in saying that they expected to have a great deal of trouble by having a different capacity of cars among the same men. A freight agent ought to know enough to load a car according to its stenciled capacity. We are having a great many broken axles and hot boxes on the small journals where the cars are loaded with 15 tons. The small journal is not economical to load 15 tons upon, and run even at 15 miles an hour. The standard journal can carry 20 tons with a speed of 30 miles an hour, and I think that is economy, but when it is loaded beyond that, I am inclined to think unless the road beds are in better condition than most of them are, that you will find the axle spring very materially, causing bad wear of both track and wheels.

AMENDMENT TO THE CONSTITUTION.

The committee on this subject made a lengthy report, accompanied with about fifty replies to the circular issued by the committee on the 8th of April to railroad presidents, managers and superintendents. Of these replies, only one was distinctly opposed to the proposed amendment. The report, after giving these replies in detail, concludes with an argument in favor of the adoption of the amendment, and in anticipation of various objections that would probably be made to it. A brief discussion followed, which developed but little opposition, and the amendment was then agreed to without a dissenting voice. It will be part of Article III. of the constitution, and reads as follows:

"SEC. 1. There shall be three classes of members—active representative and associate members.

"SEC. 2. Any person holding the position of Superintendent of the Car Department, Master Car-Builder or Foreman of a railroad car shop, or one representative from each car manufacturing company, may become an active member by signing the constitution, or authorizing the President or Secretary to sign for him, and paying his dues for one year.

"SEC. 3. Any person having a practical knowledge of car construction may become a representative member, by receiving a written appointment from the President, General Manager or General Superintendent of any railroad company, to represent its interests in the Association. Such members shall have all the privileges of active members, and in addition thereto, on all measures pertaining to the adoption of standards for car construction, or the expenditure of money, they shall each have one more vote for each thousand cars the company which they represent owns. In the enumeration of four, six or twelve wheeled cars, four axles to count as one car. The dues of representative members shall be in proportion to the whole number of votes they are entitled to cast. Their membership shall cease if their appointment is revoked by any officer authorized to make it, or when such a member leaves the employ of the company by which he was appointed: Provided that no representative shall represent more than one company.

"SEC. 4. Civil and mechanical engineers, and others whose qualifications and experience may be valuable to the Association, may become associate members when recommended by a supervisory committee. All associate members must be elected by ballot at a regular meeting, and five dissenting votes shall reject. Associate members shall be entitled to all privileges of active members, except the privilege of voting."

TREASURER'S REPORT.

Balance on hand last year		$663.41
Received annual dues		370.00
		$1,033.41
Due Secretary, June, 1881	$103.10	
Paid for reporting	100.00	
Printing annual report	355.30	
Circulars	25.00	
Postage stamps	38.50	
Incidental expenses	28.00	
		649.90
Balance on hand		$383.51

ASSOCIATION ROOMS IN NEW YORK.

Balance on hand last year		$17.05
Received from advertisers		1,200.00
Received for rent		358.00
		$1,575.05
Rent of rooms	$1,006.00	
Janitor's salary	300.00	
Reporting proceedings of meetings	50.00	
Register, postage, fuel and incidentals	147.26	
		1,503.26
Balance on hand		$71.79

STANDARD FREIGHT CAR TRUCK.

Mr. John Ortton, the Chairman of the Committee on this subject, reported by letter that he was unavoidably detained from the convention, and could not present a suitable report at this time. The subject, however, had been very fully discussed by the members of the association, who had quite uniformly expressed their opinions in favor of the principle embodied in the Thielsen truck, as constructed by the Michigan Central Railroad Company for their recently built cars. Mr. Ortton states it as his own opinion, and as also the opinion of his associates on the committee, that this truck is the best one that has come to their knowledge, and that, as such, they would cordially recommend it to the consideration of the convention.

AUTOMATIC DRAW-BARS FOR FREIGHT CARS.

To the Master Car-Builders' Association:

Your Committee on Automatic Freight Car Draw-Bars present the following report: We find the subject of automatic couplers to be one of vast magnitude. There is probably no subject in connection with car construction that is attracting more attention than this, as is evident from the fact that about 3,000 patents have been issued for these devices, and still there is no end. To get an intelligent idea of what coupler is being most generally used, and with what results, your committee issued about 100 circulars, to which we received 28 replies. Of these, 17 roads have not had any experience with automatic draw-bars; 4 are using Safford's; 2 the Perry; 1 the Adams; 1 the Ames; 1 the Le Hay; 1 both Whitford and Safford; but all to a limited extent. The committee have also examined a great many models, some of which have special merit; but as there may be many others of equal merit that have not come to our notice, we refrain from mentioning any in particular.

It does not appear a difficult matter to select a coupler which would be perfectly automatic in itself, but the difficulty presents itself in finding one that will work automatically with the various draw-heads now in use. Our experience is, and we find it to be that of all car-builders, that the lack of uniformity in the height of draw-bars is the one great drawback in the way of a perfect automatic coupler. From the information we have received, and the knowledge we have obtained by personal investigation, we are unable at this time to recommend any automatic draw-bar for a standard. We would recommend that the subject be continued, and that it be referred to a committee of five, whose duty it shall be to investigate the merits of those various devices, and when such committee shall have decided upon a certain number as having special merit, they shall request the car-builders of as many roads as in their judgment may be advisable to give them a thorough test.

JOHN S. LENTZ, *Committee.*

WOOD, IRON AND STEEL IN CAR CONSTRUCTION.

To the Master Car-Builders' Association:

Your Committee on the substitution of iron for wood and steel for iron in car construction, would respectfully report that the past year has witnessed a less rapid advance than was desired by the sanguine friends of this movement, and yet the conservative men say we are going forward quite fast enough for the good of the railway companies, and for the time required to test thoroughly the changes that may be introduced in order to determine whether they are really improvements, and not changes for the worse. Some close observers among our number are suggesting changes in proportions to overcome indications of weakness in iron body-bolsters, claiming that some of the iron used is too wide and too thin; and although well calculated to resist severe side strain, is not so well suited for severe vertical strain of iron loads. They suggest that in their judgment the weight of iron is ample in each bolster, but that it is too wide and too thin, and lacks proper staying by thimble or space bolts.

Substantial progress is being made in the substitution of iron for wood in the construction of car trucks. A number of new devices will doubtless be presented for your consideration, illustrated by models, to which the Committee would urge your careful attention. Your Committee is informed that a car built according to the patents of the United States Rolling Stock Co. is being tested by the Pennsylvania R. R. Co., the results of which we have not been able to obtain, and therefore can not report them. A preliminary test of the car has been made at Middletown, Pa., which is said to have been very satisfactory. We hope that very soon you will be informed from an official source.

The price of steel is still maintained at so high a figure that but few are disposed to substitute it for iron. It is to be hoped that before another meeting of this convention the price of steel will be so reduced as to make it possible to use it in car construction.

W. R. DAVENPORT, }
JOHN KIRBY, } *Committee.*

BRAKE-SHOES.

To the Master Car-Builders' Association:

Your Committee to investigate and report upon "brake heads and shoes" were convinced at the time of making their report to you last year, that the brake head and shoe known as the "*Christie*" was the best of the many that had been brought to their notice, and would have recommended it, had they not been under the impression that patents would not be considered. In the year that has passed, we have given the matter careful consideration, and can see no reason for changing our minds. We find that the patent expires September 12, 1882, so that the matter of royalties need not be considered.

We would therefore recommend that the brake head and shoe known as the "*Christie*" be adopted, and be known as the Master Car-Builders' standard brake head and shoe. Also that arrangements be made with the *Railroad Gazette* to furnish standard drawings of the same. In regard to placing brakes on all the wheels of freight cars, we have made several experiments in relation to it, and are satisfied that when applied to all the wheels the car will be stopped much quicker, and that the brakemen are not obliged to apply the brakes to as many cars to stop a train as if they were applied to only four wheels. With the same power applied where there are brakes on eight wheels instead of four, a large amount of friction is obtained, and yet the wheels do not slide, therefore bringing the train to a stop in a shorter space of time.

We are satisfied that there is a very large percentage less of flat wheels when brakes are applied to all the wheels, and would strongly recommend such an application of the brakes to freight cars.

J. W. MARDEN, }
S. A. DAVIS, } *Committee.*

STANDARD WHEEL GAUGE.

To the Master Car-Builders' Association:

Your Committee on Standard Wheel Gauge submit the following report:

When the committee was appointed they were directed to confer with civil engineers of railroads with a view of arriving at the general manner in which they gauged their track, the allowance for clearance in frog-guards, guard-rails, etc.

From the information thus obtained your committee find that the most common practice in laying track is as follows:

On tangents tight gauge, on 4 ft. 8½ in. between rails; on curves from 1 to 7 degrees, ¼ in. clearance, or 4 ft. 8¾ in. between rails; on curves from 7 to 10 degrees, ½ in., or 4 ft. 9 in. between rails; on curves over and above 10 degrees, ¾ in., or 4 ft. 9¼ in. between rails. The most common practice is to allow 1¾ in. clearance in the guard of frogs and 1¾ in. clearance in the guard-rails opposite the point of the frog.

We find that no regard is taken by many railroads as to the position of the guard-rail. When frogs are laid on curves they generally secure them to the usual distance of 1⅝ in. from the main rail, disregarding the allowance given the track on curves.

Your committee suggest that the clearance of the guard-rails on tangents should be opposite the point or frog, the same as the guard in the frogs, 1¾ in. or 2 in., as the case may be, and on curves the clearance between the guard-rails should be as much greater as the difference may be in the width of the main rails over and above 4 ft. 8½ in. gauge.

Civil engineers and track-masters say to us that we must gauge our track to conform to their track, and your committee are of the opinion that they are right, and that the cause of many accidents has been oftener the fault of the gauge of wheels than with the gauge of tracks. One of the principal discussions at our annual meetings has been how to make the gauge of wheels for a 4 ft. 8½ in. track conform to all other gauges from 4 ft. 8⅝ in. to 4 ft. 10 in., and your committee cannot suggest, and do not deem it prudent, safe or consistent to suggest, such a gauge.

It is becoming more and more apparent how the question can be solved, when we notice that they are fast discarding the different gauges to the one most in general use—4 ft. 8½ in.

From the many and various answers received from our inquiry as to the size of wheel-gauges used by different roads from the 4 ft. 8½ in. gauge of track, we find a majority favor a clearance of ⅝ in., claiming that this distance has been practically demonstrated as being the most economical in operation, and that the tonnage of the trains has been decidedly increased by the change of ½ to ¾ of an inch clearance.

There seems to be, however, a difference of opinion with your committee, the minority of which think that with the present construction of the 4 ft. 8½ in. gauge its clearance of 1⅝ in. in the guard of frog and the same in the guard-rail, and with the tendency of trains to spread the rails, that ½ in. clearance is sufficient for the wheels, and any deviation from it is detrimental to the flanges of the wheels and to the rolling stock generally, the proof of which can be shown conclusively when you consider a greater diminished clearance between the flanges of the wheels and the increased clearance in the gauge of the tracks, particularly when passing through frogs and curves.

Therefore we could not agree upon a standard gauge for wheels under the conditions of the present construction of the 4 ft. 8½ in. track with its curves, frogs and fixtures, and as your committee could not report unanimously on a uniform standard wheel-gauge it was thought best to leave it to the consideration of the association.

The committee are unanimous in their opinions that the wheels should be gauged between the flanges on the inside of the wheels, as this point remains fixed and governs the position of the distance in guard-rails, while the wear on the front of the flanges continually changes their shape, and it leaves no definite point to work from when refitting old wheels.

This suggestion necessitates a uniformity in shape of flanges and width of tread of wheels.

Your committee submit the accompanying drawing for wheel-gauge, which may be used to gauge from either side of the flanges, more particularly for gauging wheels in interchange of cars; also standard gauges for shops, classified diameter-testing gauge, wheel-bore-testing gauge, axle-centering gauge, journal-shoulder gauge, journal distance gauge, journal length and diameter gauge, flange and journal gauge, guard-rail gauge and wheel circumference gauge; also a full-size tracing of section of wheel, and recommend their adoption.

Your committee would further suggest to this convention that a standard gauge for guard-rails be recommended to engineers, road-masters and trackmen generally to insure the proper distance of guard-rails from frog-guards, so as to prevent unnecessary strain on wheels and axles in passing through frogs.

R. C. BLACKALL,
DAVID HOIT,
T. D. ADAMS,
} *Committee.*

The convention decided to hold an adjourned meeting at Niagara Falls on the 10th of October.

The committee on the subject of the next regular meeting reported in favor of Buffalo or Indianapolis. Action on the report was deferred until the Niagara Falls meeting; also the subject of appointing a joint committee of the Master Mechanics' and Car-Builders' associations to fix the time and place for the next annual meetings.

A vote of thanks was passed to the Pratt & Whitney Co. for their endeavors to establish a class of gauges which can be relied upon.

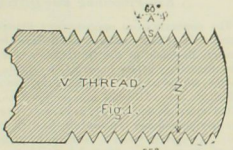
[An abstract of the discussion on committee reports and other topics will be continued in our next issue.]

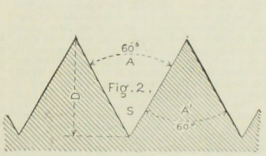
Standard Screw Threads on Cars.

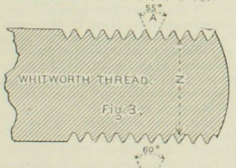
[Report of the Committee of the Master Car-Builders' Association appointed "to investigate and report on the present construction of screws and nuts used in cars; and the amount of accuracy that is desirable to secure and the best means of maintaining it in the standard adopted by the Association in Richmond, Va., June 15, 1871, and to draw up communications addressed to the managers and superintendents of railroads, showing the necessity for the use of even sizes of screw threads, and the amount of saving, as near as it can be estimated, which will result to the roads by strictly adhering to this practice," made at the annual Convention in June, 1882.]

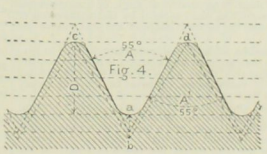
The Committee to whom this subject has been referred, and who have had it under consideration for several years, find that to give a clear understanding of it a brief historical review of what has been done is requisite. Without other introduction, then, it may be said that in 1864 the inconvenience and confusion resulting from the diversity in the screw threads used in machine and other construction was brought up for consideration before the Franklin Institute of Philadelphia. A committee was then appointed to investigate and report on the subject. That committee recommended the system designed by Mr. William Sellers, and the Institute afterwards adopted their recommendation. Practically the three systems from which they were obliged to choose were, first, the ordinary sharp V thread shown in figs. 1 and 2. Fig. 1 represents a section of an inch bolt full size, and fig. 2 a section of the thread enlarged eight times its actual size. Figs. 3 and 4 show Whitworth's thread and figs. 5 and 6 Sellers' system. The angle A and A' between the sides of the V thread is generally 60°, although this is not uniformly so, when D is the depth D, from the root of the threads to the point is slightly less than $\frac{5}{8}$ of the pitch. In the Whitworth thread the depth D is $\frac{8}{8}$ of the pitch, and the top and bottom of the threads are then rounded as shown. The angles A and A' of the sides of the threads to each other are 55°.

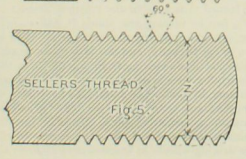
The objections to the V thread are that the point or outer edge of the thread is sharp and therefore very frail and liable to injury from contact with other objects. The space S or groove between the threads, at the root, is also sharp, which facilitates fracture under strain and is a source of weakness in the screw. The

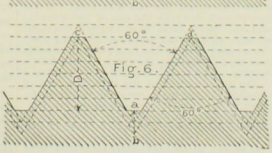












depth D of the V thread, being slightly greater than that of the Whitworth thread, the effective diameter N of the screw, at the root of the thread, is materially less in the former than in the latter.

In Figs. 4 and 6 the contour of a V thread is shown by the dotted lines *cb* and *db*. It will be seen that if a V thread is used instead of the Whitworth or Sellers the former would cut into the bolt farther, by a distance represented by *ab*, than the others do.

The objections to the Whitworth thread are that the angle of 55° can not be measured or laid off with ordinary tools, and that the rounded corners at the point and root of the threads are extremely difficult to produce with any degree of precision in the tools required to make screws. These considerations led Mr. Sellers to design the system of threads the form of which is shown by Figs. 5 and 6. In this the angle of the V thread, 60°, is retained, but instead of rounding the point and root these are made flat, one-eighth of the depth of the thread being taken off at the top, and one-eighth at the bottom, which leaves the depth of the thread somewhat less than $\frac{8}{8}$ of the pitch. This leaves the effective diameter N of the bolts somewhat greater even than that of the Whitworth thread. The flat top and bottom in screw-making tools can be easily and accurately made, and the angle of the thread can be produced by simply laying off a triangle having equal sides, or [subdividing the circumference of a circle with its own radius, and drawing lines from adjacent points of subdivision to the center. The difference in the effective diameter of the Whitworth and Sellers' systems of course gives them greater strength to resist tension and torsion than screws with V threads of 60° have. It is true that the V thread might be made with sides having a more obtuse angle to each other, but in that case the nuts would be subjected to greater strain.

In a report made in 1868 to the Chief of the Bureau of Steam Engineering of the United States Navy, by a board of engineers, the difference in the resistance to tension and torsion of bolts with Seller's threads, compared with those having V threads, was calculated, and is given in the following table:

Table showing the increased percentage of tensional and torsional strength of bolts having the Sellers thread as compared with bolts having the common sharp V thread.

Diameter in screw.	Number of threads per inch.	Greater percentage of resistance to tension of bolts with Sellers' threads.	Greater percentage of resistance to torsion of bolts with Sellers' threads.	Diameter of bolt or screw.	Number of threads per inch.	Greater percentage of resistance to tension of bolts with Sellers' threads.	Greater percentage of resistance to torsion of bolts with Sellers' threads.
Inch.				Inch.			
¼	20	28.3	45.4	1	8	14.1	21.9
5-16	18	23.1	36.6	1⅛	7	14.6	22.7
⅜	16	21.5	33.9	1¼	7	12.7	19.7
7-16	14	20.9	32.9	1⅜	6	14.1	21.8
½	13	18.9	29.7	1½	6	12.4	19.2
9-16	12	17.8	28.0	1⅝	5½	12.4	19.2
⅝	11	17.0	27.5	1¾	5	12.8	19.8
¾	10	15.5	24.2	1⅞	5	11.7	18.1
⅞	9	14.6	22.3	2	4½	12.4	19.1

The data of this table may be approximately summed up by the statement that the smaller bolts, with the Sellers thread, have about a *quarter* more strength, the medium sized ones a *sixth* more, and the larger ones an *eighth* more strength to resist tension than screws having an ordinary V thread. The resistance to torsion of screws with the Sellers thread is about a *third*, a *quarter*, and a *fifth* greater than those with a V thread.

These advantages of the Sellers thread were recognized by the board of engineers referred to, and they reported that "the board unhesitatingly recommends it as a standard for the Navy." Mr. Isherwood, the chief of the Bureau of Steam Engineering at that time, wrote to the Secretary of the Navy, and said that he "fully agreed with the conclusions of the report." Hon. Gideon Wells, at that time Secretary of the Navy, then issued the following order:

"The standard for the dimensions of bolts and nuts, as determined by the board, is, upon your [Isherwood's] recommendation, authorized for the naval service."

Soon after its organization the Master Mechanics' Association recommended the Sellers or Franklin Institute system of threads for general use in locomotive construction, and in 1871 the Car-Builders recommended it for cars.

Unfortunately, though, when this was done, a large proportion of the members of the two associations seemed to have the impression that the Sellers system consists simply in a standard for the number of threads to the inch, and apparently not sufficient effort has been made to impress the fact on the minds of those who have the control of such matters that three features are essential to the Sellers system:

FIRST, *screws must have a given number of threads per inch.*

SECOND, *the threads must be of the form and proportions designated.*

THIRD, *the diameters of the screws must conform to the sizes specified.*

A screw which does not conform to the Sellers system in all *three* particulars has not a legitimate Sellers thread. All screws with a number of threads per inch different from those given in the preceding table do not agree with the requirements of the Sellers system. But, even if the number of threads per inch is right, if the *shape* of the thread is different from that specified it is not a Sellers screw. It is just as much an illegitimate or bastard screw if the thread is made V shaped and the pitch right as though the pitch was wrong and the shape of thread was right.

The committee wish to impress upon this Association that a specific diameter of the screw is an essential feature of the Sellers system. A screw with a Sellers thread must be of one of the diameters given in the table. There are no other sizes in the system, excepting some larger than those given, which are not used in car construction. There is no such thing, for example, as a Sellers screw $\frac{1}{4}$ in. in diameter. That size is not recognized and has no existence in the system, and if a screw is made, as is often done, $\frac{3}{4}$ in. in diameter "a sixty-fourth" or "a thirty-second," large it ceases to be a Seller's screw. Uniformity in diameter is as essential to interchangeability as uniformity in the number of threads per inch or the shape of the thread, and the importance of maintaining the former can not be too strongly urged on this Association. Just as soon as the practice is introduced of making screws threads "over size," or a thirty-second or sixty-fourth large, interchangeability of bolts and nuts becomes impossible. If the Sellers standard is adopted, no screws should be tolerated which are a fraction of an inch larger or smaller than the diameter specified for that system.

The committee are quite well aware that the reason given for making screws over size is that round iron is nearly always rolled larger than its nominal diameter, and that it is impracticable to cut it down to the required dimension with the dies used in cutting screws. *If* iron is over size there will, of course, be this difficulty; but there is no serious trouble in getting round iron made of the right diameter. On the Erie road this whole subject was thoroughly investigated by Mr. Chanute a few years ago. He then found that manufacturers were furnishing nearly all iron for bolts over size, and that the company was then consuming about 700,000 pounds of round iron for bolts. "On this," he writes, "we estimated the oversizes and weights to be not less than 5 per cent., making 35,000 lbs., worth at 3 cents per pound $1,050, which we paid for more than we ordered." He therefore issued the following order:

"*All iron and steel received for bolts shall be carefully inspected, to make sure that it does not run over or under size, and bars involving double cutting, or too small, shall be rejected.*"

This order has been in force for several years, and Mr. Chanute has informed your committee that there is no practical difficulty in enforcing it. The manufacturers who supplied iron to the company were first notified that thereafter no iron which was over size would be accepted. The above order was then issued, and, although it was found necessary at first to reject a few lots received, the manufacturers soon "grasped" the idea, and since then there has been no trouble, excepting to inspect the iron and reject an occasional lot for not conforming to the proper dimensions. It will thus be seen that not only does the use of over size screws make interchangeability impossible, but it is also a source of additional expense to a railroad company which is not to be despised. There is therefore every reason for adopting the Sellers standard sizes of screw threads for all screws used in car construction.

But, while the form, proportions and dimensions of the standard screw threads were as definitely fixed by Mr. Sellers and the action of the Franklin Institute as it is possible for them to be, and although it was thus made plain what the standard screws *should* be, subsequent experience showed that it was not so easy as it appeared to make them conform with a sufficient degree of precision for practical purposes to the requirements laid down by Mr. Sellers. This difficulty was very well described by Mr. Chanute at one of the monthly meetings of this Association in New York, held on Dec. 18, 1879.

That gentleman was then in charge of the machinery department of the New York, Lake Erie & Western Railroad. The meeting was called to consider "The standard system of screw threads and the best method of maintaining exact sizes of screws so that bolts and nuts may be interchangeable." Mr. Wm. Sellers, the originator of the system which bears his name, and the manufacturers of taps and dies were invited to be at the meeting and were present. Mr. Chanute then said:

"In 1874 the Sellers system was adopted on the Erie road, and a set of standard taps and dies had been furnished to each of the shops on that line, which as they wore out were replaced by others made from the originals at each of the shops. In 1876 attention was called to the fact that some nuts cut at one shop would not fit bolts cut at others, and an investigation was made. A set of nuts of the different sizes were cut at each of the shops, and were sent to Messrs. Pratt & Whitney, who fitted soft plugs, made of Babbit metal, into each of these nuts. These were exhibited on the table. By taking at random a plug and a nut of nominally the same diameter it was found that the one would rarely fit the other. It was seen that not only were the diameters different, but in many cases the pitch and angle of the threads had been altered from the original standard and the taps made at different shops did not conform to each other. Nuts were taken from 23 or 24 foreign cars, and these not only were unlike their own screws, but were also unlike each other. This was the cause of great waste, detention and expense in making repairs.

"It was found, moreover, that the practice had generally obtained of making taps over size, so that all bolts above $\frac{5}{8}$ in. in diameter were $\frac{1}{64}$ in. and the smaller bolts $\frac{1}{32}$ in. over size. Investigation showed that the company was paying for about 35,000 lbs. of iron more than would have been required if it had been furnished of exact sizes. Instructions were therefore issued that no more taps and dies should be made at the various shops, and since then these tools have all been bought from manufacturers of them at considerably less cost than they could be made for in the company's shops. It was supposed that in this way absolute uniformity could be obtained. In order to have the benefit of competition, however, taps were bought of different manufacturers. It was found, however, that some of the nuts cut with taps bought of one manufacturer could not be screwed on a tap made by another. This led to a request to the manufacturers to furnish sets of their standard screw gauges, which were compared with the standard gauges at the Brooklyn Navy Yard. To their surprise it was found that the gauges did not agree with each other, and although the difference was not very great, it was sufficient to prevent the bolts and nuts, made to conform to them, from interchanging with each other."

After Mr. Chanute had made this statement, Mr. Sellers said: "The remarks lead me to believe that the difficulty does not exist in the system of screw threads so much as it does in the matter of the original standard. * * * It perhaps has been thirty years since I first used what we supposed were standard sizes in our works, as I was very early impressed with the importance of having some standard to which we might refer all our measures. There was no one making standard gauges at that time, except Mr. Whitworth, of Manchester, England, and we imported a full set. They were very nicely fitted up—so nicely, indeed, that they seemed to be unsuited for the workshop, and I devised a set of inside and outside callipers for workshop use, and used the standard gauges merely for the purpose of reference. In our innocence, we never suspected that there might be, practically different measurements of the same thing, or that there was any difference in such standard measures; and we might, perhaps have gone on much longer in that blissful state of ignorance if it had not been that we ordered another set from Mr. Whitworth, and when we had the two we found that they did not at all agree perfectly. It was impossible to determine which was right, without going into a very laborious investigation, which we could not think of, and we put the old set aside. I remember that we did not purchase the last set until after Mr. Whitworth had written his paper upon contact measurements, and we therefore used the last set, thinking that it would be more exact."

Subsequent inquiry elicited the fact that the manufacturers of taps and dies had been working to different standards. Soon after the Sellers' standard was recommended by the Franklin Institute a number of sets of their new standard screw-gauges were made by Mr. Fox. One of these sets is at the Brooklyn Navy Yard, and others were bought by manufacturers of taps and dies, and were used as standards to which they worked, while the Pratt & Whitney Company undertook to work to what they regarded as a true inch, and the fraction thereof. As neither the inch nor the gauges were certainly known to be correct, it is not remarkable that the bolts and nuts cut with tools made by different manufacturers were not interchangeable.

The question then came up, which was right? With commendable zeal the Pratt & Whitney Company undertook to test the matter by reference to the most reliable standards and measuring instruments in the country. Like Diogenes with his lamp, in search of an honest man, this company went to and fro in the land in search of a true inch, a true foot, or a true yard. They procured from different sources what they supposed were the most reliable standards of measurement, and found that none agreed. They had the same standards measured by what were considered the most reliable measuring machines and instruments in the country, and found that no two of these would measure the same standard alike.

It would lengthen out this report—already too long—to an unreasonable extent to detail their efforts in this direction. Let it be sufficient to say that the results of their investigations led them to doubt whether there was any final standard of reference in this country, or any instruments for measuring and subdividing

the standard, if it existed, which could be relied upon to give results which would be at all satisfactory. Inasmuch as the matter was of very great importance to that company in the manufacture, not only of taps and dies but of other tools, gauges and instruments of precision, they determined to go to the bottom of the subject, and lay a foundation against which no wind or wave of doubt or uncertainty could prevail. Happily, about this time this company was brought into communication with Prof. W. A. Rogers, connected with the Cambridge Observatory, and Professor of Astronomy at Harvard College, who was interested, for a widely different purpose though, in the subject of precise measurements, and had studied it here and in Europe. He was satisfied that the celebrated Whitworth measuring machine had very great defects, and therefore he proposed an entirely different system. He had the ideas, and the Pratt & Whitney Company had the means and the skill to put them into practice. The astronomer and the mechanic therefore co-operated, and the former supplied the plan for a comparator, or measuring machine, and it was agreed between them that the company should make two of them, one to be used by Professor Rogers in his scientific investigations at Cambridge, and the other the Pratt & Whitney Company would use in connection with the manufacture of tools for minute measurements, gauges, etc.

The company also procured the services of Mr. George M. Bond, a graduate of the Stevens Institute, who has had charge of the work done on the machine, and to whom much of the credit is due for the results attained. Ever since your committee was first appointed, the Pratt & Whitney Company has been engaged in constructing these machines and doing the preliminary work and producing the plant with it which was required to construct exact screw and other gauges.

It will be impossible in a report like this to give a description of the methods employed to secure the utmost attainable precision, nor of the construction of this machine. It must be sufficient to say that with it measurements of $\frac{1}{50000}$ of an inch can be made with certainty. To give an idea of what is implied by this, let it be supposed that a person should take a pair of dividers and lay off 50,000 prick marks $\frac{1}{2}$ of an inch part in a straight line. To do this the line would require to be over 520 ft. or a tenth of a mile long. Imagine that many prick marks compressed into the space of 1 inch, and you have an imperfect idea of the minuteness of the measurements which can now be made by the Pratt & Whitney Company.

Doubtless there are many members of this Association, who like the members of this Committee, when they undertook the work assigned to them, looked upon the standards of length and measurement in this country could not answer such an inquiry. A brief statement of what the existing standards of linear measurements actually are may therefore be interesting. Like many other good things, we have inherited these from Great Britain. In 1834 the British standards were destroyed by the burning of the Parliament buildings. In an article in the *Franklin Institute Journal* of February, 1880, by Professor Hilgard, he says :

"The actual standard of length used in this country was a bronze scale of 82 in., subdivided on silver to tenths of inches, which had been prepared for the Coast Survey of the United States by Troughton, of London. The 36-in. comprised between the 27th and 63d inches, found equal to the average of the whole scale, were taken as the standard yard, and the temperature at which this was considered to be standard, that is, as being equal to the British standard yard, was presumed to be 62° Fahr."

The Troughton scale was made before the destruction of the British standards. Since then the latter have been reproduced by reference to all their accredited standards with which they had originally been compared. In Clark's "Manual for Mechanical Engineers" it is said: "The present British standard yard is a solid square bar of gun-metal, kept in the office of the Exchequer at Westminster, 38 in. in length, 1 in. square, at the temperature of 62° Fahr., composed of copper 16 ounces, tin 2½ ounces, and zinc 1 ounce. Two cylindrical holes are drilled half through the bar, one near each end, and the centres of these holes are 36 in. or 3 ft. apart—the length of the imperial standard yard."

Since the British standards have been reproduced, some fifty copies have been constructed and intercompared, and certain of these copies have been sent to the United States. According to Professor Hilgard, recent comparisons have shown that the Troughton scale is 0.00076 in. in the yard too long. He says: "This change, though sensible in operation of extreme scientific precision, is really of no consequence in ordinary practice.

"Extreme accuracy in this matter is beset with great difficulties, for in addition that of ascertaining for each particular bar the rate of dilatation by temperature, there is an uncertainty in regard to permanence in the length of the bars themselves. Of the two standard yards presented to the United States, one is of bronze and the other of Low Moor wrought iron. These are found to have changed their relative length by 0.00025 in., or 1-400 of an inch in 9 years, the bronze bar being now relatively shorter by that amount."

The standard bars used by the Pratt & Whitney Company, were first prepared by them, and were graduated by Professor Rogers, and were then sent to Washington to be compared with the standards there. Professor Hilgard reported that one bar was 0.000053 inch longer than the imperial yard, and another was 0.000036 inches shorter than this unit; the mean of the two bars differs from the imperial yard by a quantity less than the *certainty* with which such comparisons can be made, viz., 0.00001 inches.

After having a bar of standard length, it becomes necessary to subdivide it into such divisions as are required in practical use. A hardened steel six-inch bar was thus graduated into line measure, and is the one which is chiefly used as the standard for the measurements required in the manufacture of screw gauges. To quote from a paper read before the American Society of Mechanical Engineers by Mr. Bond, this bar has ruled "upon its upper polished surface lines, ruled four separate inches, also lines representing—counting from the end of the second inch—the lengths corresponding to the *bottom* diameters or 'tap sizes' of the United States or Franklin Institute standard screw threads, from a quarter inch to four inches."

The lines of graduations on this bar are so minute that it requires eyesight to see them with the naked eye. All comparisons of these divisions are made by observing the lines through a microscope. The bar was ruled or graduated upon a dividing engine made by the American Watch Company at Waltham.

To give an idea of the difficulty of making exact measurements, it may be said that every good workman knows that much greater exactness of measurement is possible with two rules used "end to end" than can be made by drawing a line at the end of one rule and then measuring to that line with the same rule. In the same way a pair of callipers can be set more exactly to a gauge than to the lines or divisions on a rule. The one method is called "end measurement" and the other "line measurement." For practical use the line graduations on the six-inch bar referred to must be reduced to end measurement, or, in other words, it must be possible to make a gauge which, measured over all, will coincide *exactly* to the graduations on the bar. It will be impossible to explain the ingenious way in which this is done with practically absolute precision, and also the way in which end measurement of a gauge, or of one bar, can be compared with the graduations on another bar on the machine described. This can be done quickly and with the utmost precision. Gauges of any dimensions indicated on the bar can be made and verified, and from these end measurements can be taken to work with.

But it may be asked in what way are car-builders concerned, or of what practical value are such extremely minute and exact measurements to them? In reply it may be said that much smaller measurements than persons usually suppose are of importance in ordinary work, and as a matter of fact workmen are constantly in the habit of measuring with callipers and other means, quantities as small as 0.001 of an inch or even much less than this. This was illustrated by a plug and ring, which was exhibited. The former was ½ in. in diameter, and fitted the ring as nearly perfect as it is possible to make it fit. The second plug is 0.001 of an inch smaller than the first one. The second one fits so loosely in the ring that you can feel it shake. A good machinist in fitting the pins in a link motion can easily discern a difference of much less than 0.001 in. in the diameter of the pins or their bearings. If the latter are of the right size and some of the pins are that much too large, interchangeability will be impossible. The same thing is true of screws and nuts. To illustrate this, a ¾ bolt and nut were shown, the two being an example of an ordinary good fit. Another bolt $\frac{1}{50000}$ smaller in diameter was also exhibited. The nut was so loose on the latter that any good mechanic would pronounce it a bad fit and a bad job. It will thus be seen that in practice a very considerable amount of precision is required in order to secure good workmanship. As a matter of fact, there are no serious difficulties in maintaining such a degree of precision in practice if there only is some standard to work to.

The results of the investigations of Mr. Chanute on the Erie road showed what occurs when taps and dies are made nominally of the Sellers system, but with no common standard of measurement. To maintain a system of screw threads which will be interchangeable it is essential that they be made to some common and exact standard of measurement. The uncertainties of two foot rules are too great to maintain an interchangeable standard when as much precision is required as is needed in screws. If the steps and manufacturers have standards of measurement which do not agree the screws made from them will, of course, not be alike. It is essential, therefore, that there should be a uniformity in the standards. This it is extremely difficult to bring about, and unless the standard proposed is as near right as it can be made it will be impossible to secure its general adoption. People object to conforming to what they know is not right, and the person who can say my standard is right and yours is wrong has an unanswerable argument in favor of his practice.

Besides being important that standards should be exactly right it is essential that it should be possible to reproduce them to any extent that is desirable, even though the original was lost. This the Pratt & Whitney Company have supplied the means of doing.

It may be said also that even if a degree of precision at all approximating to that which has been arrived at by the Pratt & Whitney Company could be attained in the manufacture of screws and nuts it could not be kept up on account of the wear to which taps are necessarily subjected.

Messrs. Pope & Townsend, of this city, have informed your committee that the record taken from their books shows that with a ¾ in. tap they have tapped 18,800 cold-pressed nuts without any difference being perceptible in the size of the nuts. With a ⅝ tap they have cut 16,200, and with a ½ in. tap 18,000 without perceptibly changing the size of the nuts.

It may be thought, though, that accuracy and interchangeability of the Sellers system of screws can be maintained if they are only made of the right pitch and of the specified diameter on the outside and at the root of the thread, and if the tool for cutting the latter is made of the proper form and the thread is then cut so that the flat at the point and root are equal. This is true if all these operations are performed with the requisite degree of precision. It would be interesting to describe all the processes, the tools and instruments which are used by the Pratt & Whitney Company in making taps, dies and screw gauges, but to do so would increase this already extended report to inadmissable dimensions. A brief general description is all that can be given.

The first step in making a tap or screw gauge is to turn a bar of steel to the exact diameter of the outside of the screw. Then, each end of the portion on which the thread is to be cut is turned down to the diameter of the screw at the root of the thread.

Upon the exactness of this first operation the precision of the ultimate size of the gauge or tap will depend. It is therefore essential to be able to measure exactly these two diameters. The next step is to cut the thread. To do this a tool must be ground which will cut a thread whose sides will have an angle of exactly 60° to each other. An amount equal to one-eighth of the depth must be taken off the point of the tool, the flat portion being true to the sides of the thread. To make a true thread the tool must then be set so that its centre line will be square with the axis of the screw. In order to be able to do this the sides of the tool are ground so as to be true parallel planes, and the parts which cut the sides of the thread are ground so as to be true with the sides of the tool and at an angle of 60° to each other. It can then be set true in a lathe with a square bearing against its sides, and against the blank top or headstick of the lathe. What adds to the difficulty, though, is the fact that a cutting tool of this kind does not stand vertically, but at an angle of 20° to a perpendicular line. The top surface is horizontal. Now if the portions of the tool which conform to the sides of the thread were ground with an angle of 60° to each other, the edges of a plane which intersects these sides at an angle of more or less than 90° would not be inclined at an angle of 60° to each other. For this reason the tool must be ground at an angle of somewhat less than 60°, so that the cutting edges formed by the intersection of the flat top surface and the inclined edges of the tool will be exactly 60°.

It would be impossible, without elaborate illustrations, to give a description of the delicate instrument which is used to measure the exact amount that should be taken off the point of the tool for cutting threads of various sizes. It must be sufficient to say that this too is done with the highest degree of precision.

These processes and appliances are required to make a turning tool of the exact shape and size to cut the threads of screw gauges. With such a tool, then, and a blank for a gauge, such as has been described, it would seem that by cutting the thread so that the point of the tool would just touch that part of the blank which has been turned down to the size of the screw at the root of the thread, the screw must be of exactly the right size. If, as has been said, all the work described has been done with absolute precision, such will be the case; but in order to verify it, the same tool used for cutting the thread is put into a planer or shaping machine, and a template is cut with it out of a thin piece of steel. The space cut out of the steel plate will, of course, be an exact duplicate of the space between the threads. If the spaces at the root of the threads should be exact counterparts of the point of the threads themselves, the latter can be measured by the template, and if they are exactly alike it will indicate that all the operations have been performed with the required precision. If so, the screw thus made supplies a true gauge to work to. It should be kept in mind that the sides of the threads of a screw are, or should be, the actual bearing surfaces, and that in making taps and dies, the threads should be measured over the sides. With such a gauge as will be supplied by the screw described, it is an easy matter to set an ordinary pair of callipers over the sides of the thread, and then apply that size in any number of other screws or taps. A skilful tool maker will measure with ordinary callipers to within $\frac{1}{50000}$ of an inch, provided he has a correct gauge to set his callipers by. Experience has shown that with a gauge of the kind described to work from, a very high degree of precision can be attained, but it was also found that it was always necessary to make an allowance for the wear of the cutting tool which occurred when it was first used, and therefore to make it somewhat larger than the actual size of the thread.

But there is still another difficulty with screw gauges. If they are made as described, the steel must of course be soft, and a very little use would soon destroy their accuracy. It is therefore requisite that working gauges should be hardened. The process of doing so, however, changes their form and dimensions slightly, so as to destroy their accuracy. To get over this difficulty hardened gauges are made somewhat larger than the standard size. The Pratt & Whitney Company have devised a plan to grind these gauges, after they are hardened, to the exact size, form and pitch. To do this the gauges are put into a lathe and a rapidly revolving steel disk or wheel is attached to the toolholder which is moved by the lead-screw, whose pitch is exactly that of the screw of the gauge. Diamond dust is used on this disk for grinding the hardened threads, and the exact size is reproduced from a soft gauge, whose dimensions have not been changed by hardening.

For the most exact standards of reference, the Pratt & Whitney Company recommend the unhardened gauges. For standards of reference which must be used oftener, and where a high degree of precision is also required, they recommend the hardened and ground gauges.

They will also furnish another kind which are hardened but not ground to be used in the shop as reference gauges and which are correct enough for practical purposes. Specimens of all these kinds are submitted with the report.

It should be clearly understood that none of these gauges are intended for shop use, and that if subjected to much wear their accuracy will soon be destroyed. The size of new taps may be tested by them, and if of the correct size a few nuts may be cut with the new taps, and these be used as shop gauges by the workmen. As these wear they can be replaced with new nuts cut with other new taps.

The external guages, it will be seen, are made adjustable. The internal guage is the real guide to work from and the former can always be set from the latter. The committee find that there is some difference of opinion among those having most knowledge of the subject with reference to the need of the external guages. Some hold that a correct internal screw gauge is sufficient to test the size of a tap from, and then the nuts, already referred to, will answer for working guages to maintain sizes in the shop.

Complete sets of gauges like samples herewith can be furnished by the Pratt & Whitney Company in a few weeks or months, and the Committee think that the master car-builders, and all who have occasion to use screws, may be congratulated that standard screw gauges can now be procured made with a degree of precision which has never been attained heretofore, and that this has largely been due to the agitation of the subject by this Association. It is worthy of note that a remedy for the evil complained of by master car-builders, that nuts made by some firms or in some shops would not screw on bolts made by others, at first baffled the ability of the most prominent manufacturers of tools of precision in the country, and that to provide an adequate remedy it was necessary to secure the assistance of the highest scientific ability in the country, which was supplied through the co-operation of the Professor of Astronomy of the oldest and most noted institution of learning in the land. The man of science turned his attention from the planets and the measurement of distances, counted by millions of miles, to listen to the imprecation, perhaps, of the humble carrepairer lying on his back and swearing because a ⅞ nut—"a leetle small"—will not screw on a bolt a "trifle large." It is a striking example of the assistance which science can give in conducting the "practical" affairs in life.

In conclusion the committee would recommend that this Association in conjunction with the Master Mechanics' Association, procure a set of the unhardened guages manufactured by the Pratt & Whitney Company, and that these be kept among the archives of one or the other of the associations as the standard of measurement of screw threads and for ultimate reference in case of need.

They would also suggest the adoption of the following motion :

That this Association deprecates the use of screws larger or smaller in diameter by a small fraction of an inch than the sizes specified for the Sellers or Franklin Institute system, and that all its members are urged to abandon entirely the use of over or under size screws.

That the thanks of this Association be voted to the Pratt & Whitney Company for the intelligence, liberality and enterprise shown in their efforts to establish a system of accurate gauges for screws and for tools for precise measurement.

That the committee which prepared this report be instructed to send a copy of it with a suitable circular, calling attention to the importance of adopting the correct standard Sellers system of screw threads, to the presidents, managers, superintendents and master car-builders of the United States, Canada and Mexico, and that when the committee has performed that duty it be discharged.

M. N. FORNEY.

Self-Propelling Pile-Driving Car.

The engravings on opposite page illustrate a Self-Propelling Pile-Driving Car for railway use, designed by George B. Nichols, Master Mechanic of the Gulf, Colorado & Santa Fe Railway. The peculiarity of its construction consists in a supplementary engine, which is used for propelling the car. The cylinders, which are 8 × 12 inches, are connected at right angles, and located under the floor frame, as shown. The engine which works the driving-hammer is placed on the deck, and has 6 × 12 cylinders. An upright boiler is used, and furnishes steam for both engines. It has a steam feed pump and one injector. The pipes are so arranged that but one throttle is used for the two engines, either of which can be set to work at a minute's notice. The car is propelled by means of two steel-tired driving-wheels 36 inches in diameter, and an axle 5 inches in diameter. The propelling engine has link valve gear; the shaft is geared to driving axle, the gear being 3 to 1, with 2 inches pitch and 6 inches face, the smallest gear on engine shaft.

The car frame is 43 feet long and 8½ feet wide. The bedframe *B* is held in place by the centerpin *L*, upon which it can be turned so as to be in any position desired. It can be run out 12½ feet by turning the pinion *H*, and when adjusted for driving, is held in place by the cross-bar *I*. Both frame and leaders can swing laterally, and the latter can be adjusted for driving battering piles swinging from top pin *D*, or they can be lowered for driving piles in deep bridges. The deck engine will drive the hammer 15 strokes per minute, and one man can, with the gear, run the frame out or adjust the driver in any position for driving straight or battering piles. By an adjustment of the springhangers, the weight of the car can be thrown more or less on the driving-wheels, as traction may require; there are also sandpipes forward and back of wheels, as shown. A guard *A* is provided for catching on the rail in case the forward truck should get off the track. In passing through bridges, the ways *B* can be lowered by means of the hinges *C*. The back truck has a double iron swing-beam to facilitate curving. The car has also a tender for carrying coal and water.

This car has been in use on the above-named road for eight months, and is found to be very effective, and a marked improvement upon those of the usual construction. It pulls its own train of six loaded cars over a 60-foot grade at the rate of 12 miles an hour, and will pull 12 cars on ordinary grades.

THE Gulf, Colorado & Santa Fe Railroad Company is having two first-class passenger coaches and two baggage cars built at the Wason Car Works, Springfield, Mass., and 100 box and 100 flat cars at the Litchfield Car Works. The freight cars are 30 feet long, and have swing-beam trucks, iron transoms and M. C. B. standard axles, pedestals, oil boxes and brasses. The road has some 500 cars equipped with these standard appliances, and is so far doing its part to secure practical uniformity in these respects.

SELF-PROPELLING

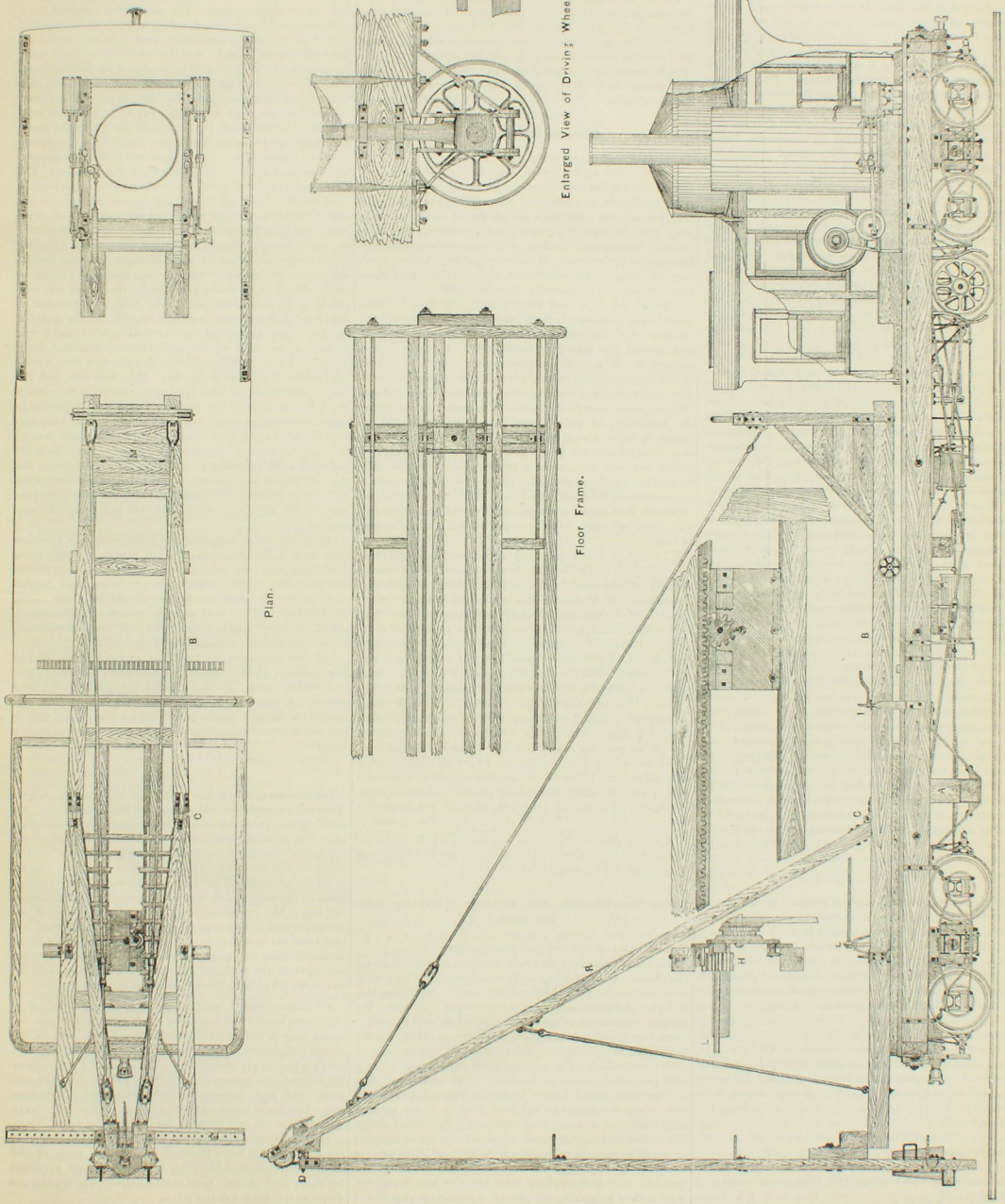
PILE-DRIVING CAR, FOR RAILWAYS,

Designed and built by

GEO. B. NICHOLS, M. M.,

of the Gulf, Colorado & Santa Fe Railway,

Galveston, Texas.



Communications.

Overhauling Locomotive Driving Boxes.

To the Editor of the National Car-Builder:

The June number of your paper contains a communication from Mr. W. F. Teat, Jr., in which he criticises my article in your May number on the overhauling of locomotive driving boxes. In the beginning of that article I stated that different gang bosses had different plans for doing the work, each considering his own plan the best. Mr. Teat evidently considers his crow the blackest, although it has several white feathers.

The practice of fish-tailing engines is nearly obsolete, because the frames built now-a-days are planed all over, and a large T square can be used for testing the squareness of jaws to much better advantage. In the next place, the center pin may or may not be exactly central, and as Mr. Teat emphasizes the word "provided" when he uses it in reference to this, he is doubtless aware that it is the weak point in his plan. In many engines built in contract shops the center bearing is not turned off, and in such case it would be necessary to fish-tail a rough casting, which would hardly be mechanical. A much better tool is a tram point used in a center punch mark on the center pin centrally between the frames. The gas-pipe tram, with the points pointing in one direction, is a very handy tool, and is to be found in nearly all locomotive repair shops, but with true squares and planed frames it is not necessary. Like the fish-tail it originated before planed frames came into use. The use of the center, which Mr. Teat refers to as being conveyed to the top of the frame, is fully explained at the bottom of the first column of my previous article. The idea is that having this center it may be carried across to the top of the other frame and squared down on to the center in the pedestal by one of the simple problems in geometry for erecting a line perpendicular to another, as explained. The center of the axle is in the "center between the pedestal jaws," provided the builder intended it to be so. The object in placing the cross-head at its central position, and then with the length of the main rod measuring back to a center piece in the front jaw, is to ascertain *where* the builder intended the center of the axle to be so as to place it there again. All the engines I have seen were built by men who were well enough versed in their vocation to put their engines up so that the piston should have equal clearance at each end of the cylinder. Hence, if we place the piston and cross-head centrally in the guides and proceed as instructed, the need of altering the length of the rod in the blacksmith shop will never occur.

If gang bosses undertake to improve on the builder's plan when overhauling work, and place the center of the axle arbitrarily in one prescribed position for all engines, as Mr. Teat suggests, they must expect to have considerable blacksmithing to do. I remeember an instance of this kind, in which the builder had used very thick shoes, thus locating the axle center back of the "center between the pedestal jaws." The gang boss, in overhauling the engine, located it in the center, using new shoes and wedges. He then found the rod to be too long, and put it up, first shortening it as much as possible by shifting the brasses. The engine went out with the piston barely clearing the front head and with an immense quantity of clearance behind. The engineer reported her as "no good," and further said she was not half the engine she was before, that she pounded badly, etc. The master mechanic heard of it and looked into the matter. The result of his investigations was that, owing to the diminished clearance on the front end, the compression ran away up above the boiler pressure, the piston forcing steam from the cylinder into the chest at every stroke. The pounding resulted from the excessive compression. That engine went into the shop again and had her axle centers placed where they were intended to go by the builder, the trouble disappearing when she came out again. The necessity of changing the length of the main rod in the blacksmith shop does not occur on any engines of reputable build, and the length of the two main rods will never vary enough to necessitate this if the engine is any kind of an engine at all.

Will your correspondent explain why, if an engine had run for three years as she came from the builder's shop, with the main rods of a given length, *he* finds it necessary to change the length of the rods in the blacksmith shop? I was for a time in the employ of a company in whose shops from four to six engines were overhauled per month regularly for a period of twenty years, the engines being of almost every kind of construction, including that of the company's; and the necessity never occurred, to my knowledge, of changing the main rod in the blacksmith shop under the circumstances referred to by Mr. Teat. In the case cited by him of one rod being slightly longer than the other, there is no necessity for any material difference in the wedges, as the rod should be brought to the right length by altering the brasses. His trouble arises from the fact that he has not put his engines up as the builder had them, and any change he might introduce would necessitate other changes.

The plan suggested in my former article was the result of observation of other plans and their weak points. I have frequently seen gang bosses who used Mr. Teat's plan, or something similar, stand around nervously with the trams in their hands, stretching a center here or there to make her "come right," applying the tram twenty times and never with a feeling of security, on account of the errors to which it is liable. By the writer's plan, a tack may be driven into the common lead centers and a fine center found thereon, with the knowledge that the tram points *will* come in every time. Gang bosses who have tried the plan illustrated never use the trams after the centers are found to lay off the boring and proof circles on the driving boxes; and I will venture to assert that Mr. Teat, after his boxes are bored and fitted, puts them up in the jaws, finds new centers, and tries the trams again with no feeling of certainty as to the result, and when the wheels are under the engine, again tries the trams. I will further venture to say that he finds it necessary to put anywhere from a quarter of a day to a day's work on filing his shoes out of wind after they are planed and placed in the jaws, and I base these assertions on the usual result of his plan as I have seen it in use. Mr. Teat may from *practice* do better with his plan than with the one illustrated in the May number of the CAR-BUILDER, as regards time; but I would not hesitate to place gang bosses of my acquaintance in competition with him, and guarantee as perfect a job as is possible in five-sixths the time he would use, he using his plan and I mine, his engine to tram as close and to have equal clearance at each end of cylinder.

FRANK C. SMITH.

Through Sleeping Cars.

To the Editor of the National Car-Builder:

A few years ago, when the traveling public knew and cared little for the conveniences of through cars, the competing railroads, as a means of advertising, arranged with the sleeping car companies for the use of their cars on as long lines as was practicable, and travelers having now become accustomed to this, very naturally expect a continuance of the system. It has recently been hinted, however, by some of the officials of through lines, that these through cars can be partially dispensed with.

I would ask how and when this is to be done? There would seem to be two reasons, at least, why it should not be done: first, the shortening of time on trunk line roads, and second, the traveling public will be likely to protest against it. It is very true that a road may be so located that a heavy expense is incurred in hauling from three to five heavy sleepers coming from different branch lines. This expense may in the future be lessened somewhat by the formation of consolidated lines. But it would, no doubt, be better for all concerned if passengers would consent to be transferred in the morning from a sleeping to a parlor car, and vice versa in the evening, with the satisfaction of knowing that the transfer would give them a comparatively fresh and clean car. Still, it can hardly be expected that such an arrangement would be accepted at once, and the roads must bear the burden a while longer, at least.

I have had much practical experience in sleeping-car management, and would like to see a more perfect system devised, and one more conducive to the health, comfort and convenience of travelers than exists at present. Many people in the warm season occupy a sleeping car two days and nights continuously, with hardly a thought as to its sanitary condition. Otherwise, there would be a rebellion and all sorts of grumbling about badly managed roads, etc. My opinion is, that through line sleepers will be run until there is a scale of berth rates more in harmony with other values. If it be objected that cheaper rates would admit all sorts of people, I would say that a Chinaman, a hoodlum or a tramp can occupy a berth in a sleeping car today if he pays for it and behaves himself. Let us have lower rates, and use the means which all well qualified railroad officials know how to employ for filling these cars with unexceptionable and decent people, and the expense of running them will be materially reduced below what it now is.

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[We wish our correspondent had stated a little more explicitly how the tramps and hoodlums are to be kept out when the berth rates are lowered.—ED.]

Letter from Chicago.—The Building of Railway Rolling Stock.

To the Editor of the National Car-Builder:

It is a noticeable fact that railroad companies throughout the country are increasing their shop facilities with a view to manufacturing their own rolling stock. Doubtless this is a wise measure, and for several reasons. At times the custom shops are over-crowded with orders, and in case of a rush of freight, many companies are unable to handle the traffic that comes to them, whereas, if they rely on their own resources for cars and locomotives, they will not only be tolerably sure of a supply at all times, but they will be more sure of honest workmanship and good materials. It is not meant to say here that there are no honestly built cars or locomotives turned out by custom shops, but it *does* make a difference whether these goods are built to sell or to use. The master of a railroad shop takes a lively interest in all the work he turns out. He selects the best materials and employs none but the best workmen, with a view to making his cars or locomotives superior to any others on his road. Cars that are bought in lots are made to sell, and although some of our custom shops turn out very fair work, it is usually inferior in point of material and workmanship to those built in the road shops.

The writer had an interview a few days since with a gentleman who served his apprenticeship with one of the largest locomotive establishments on this continent. He served in every department of the shop, and is thoroughly conversant with all the details of locomotive manufacture as it is conducted in that shop and also in other shops in which he has been employed of late. It is his opinion that if he were the manager of a railway he would prefer to have all rolling stock manufactured in the company's shops. He has seen lead, putty and paint used in shops where he has been employed, in a manner that no company would countenance in their own shops. It is also his opinion, based on experience, that the best goods are not turned out by the largest establishments. These have a reputation, and defects of material or workmanship are apt to be looked upon as a "matter of course," whereas smaller concerns must be more careful of the work they turn out in order to secure patronage. The machinery required for a well-regulated repair shop should nearly, if not quite, equal that of an ordinary manufactory, and if there are not repairs enough on hand to run the whole force for a time, the men can be very profitably employed on construction.

Mr. Boon, of the Chicago & Northwestern Railway, has lately introduced some improved shop tools, such as planers, shapers, etc., and is turning out some very fine locomotives for that road. Other roads are doing the same, and many of them are enlarging their shops, procuring new and improved machinery, and will in the future manufacture more of their own rolling stock than formerly. The advantages that will result from this are too apparent to need mention here, but it may not be out of place to say that a master car-builder or master mechanic whose experience has been in repairing and remedying defects in rolling stock, have a better idea of what constitutes a perfect car or locomotive than the manufacturer who has turned out thousands, but never had any experience in making repairs. Not a great many years since, the writer was employed in a locomotive repair shop. One day a locomotive that was comparatively new was brought to the shop for repairs. This engine had seen but little service, and it was thought at first that slight repairs only were needed, but a diagnosis by the "old man" revealed the fact that a general overhauling was necessary. This was had, and the engine left the shop in a far better condition than when she left the shop of her builders. She was improved in many important details, and was then fit for the long service she afterwards performed before being again sent to the shop for repairs. Builders of railway rolling stock are not in as good a position to note the minor defects as are the consumers, and this may be regarded as a strong point in favor of railway companies doing their own construction as far as is consistent with all attending circumstances.

One thing that is agitating the good people of Chicago just now is the great slaughter of people by street cars. The "grip cars" are taking the lead in this kind of thing, and the victims of the cable roads are numerous. As this style of road is about to be introduced in other cities, car-builders will do well to make an effort to produce a shield, or some appliance that will push the unfortunates to one side instead of mangling them.

Railroad managers are much encouraged by the recent fine weather, which is having a bracing effect on the crops, and which means an increase in the traffic in the near future. A vessel has just left here laden with oak car timber cut to size. She is bound for Liverpool, and this is not pleasant to contemplate, as we have no good car timber to spare.

WM. S. HUNTINGTON.

CHICAGO, June, 1882.

THE Chicago, Milwaukee & St. Paul Railroad Co. is constructing extensive machine shops at Minneapolis for the building and repairing of cars and engines for its western lines, the Milwaukee shops being too remote as well as too limited in capacity to meet the growing demands of the service. The new structures are of brick, and will consist of all the necessary shops for handling the extensive equipment of the road and its branch connections, and also a rail mill. The machinery will be of the most improved description, and has already been selected by a practical expert from the best that can be had in this country and in Europe. The shops when completed will be the most extensive of any in the West. About 2,000 men will be employed when in full operation.

A CORRESPONDENT, writing from Evansville, Ind., says that more hard-wood lumber is cut in that immediate vicinity than in any other locality of the same extent in the world. There are fourteen saw mills now running, and another in process of erection. The combined capacity of the mills on day running is about 100,000,000 feet per annum. Oak and whitewood are the principal kinds that are cut. The finest quality of white oak is shipped in large quantities north and west for car building purposes. There are no car shops at Evansville, except the repair shops of the Evansville & Terre Haute R. R., but in view of the abundance of timber and fuel, it would be an excellent point for such shops. Coal can be delivered at the furnace doors at less than a dollar a ton.

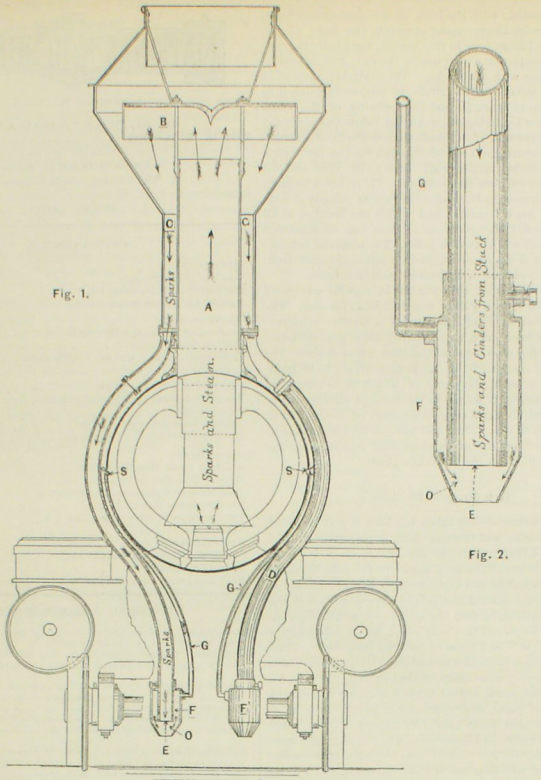

Fig. 1.

Fig. 2.

NICHOLS' LOCOMOTIVE SPARK ARRESTER.

The great difficulty in the burning of soft coal in locomotives the formation of cinders and dust in such quantities that if they are not constantly expelled the working of the parts are seriously obstructed. The easiest way to do this is to force them out of a straight stack by means of the exhaust. But this mode showers the live sparks over the train and along the track, and sets fire to whatever they come in contact with that is combustible; and when the steam is shut off while running down grade, the smoke and dust are sucked into the valves and cylinders. Until the means shall be discovered for securing a more perfect combustion by burning up these waste products, they will have to be got rid of by such mechanical devices as experience shall prove to be the most effective.

The cuts illustrate a new and very successful one, of which Mr. George B. Nichols, the Master Mechanic of the Gulf, Colorado & Santa Fe Railroad, is the inventor.

As will be seen from the engravings, the plan provides for arresting the cinders and directing them downwards so they will be discharged on the road bed, while they are at the same time thoroughly extinguished, so as not to set fire to the ties or any thing else. The cinders, sparks and dust are thrown upwards by the exhaust through the inside pipe *A* (Fig 1.), against the diaphragm *B*, from which they are directed downwards into the spaces *C C* between the pipe and the outer casing of the stack, and from thence through the pipes *D* on each side of the boiler to the road bed. To the ends of these pipes are attached water or steam cylinders *F F*, with an opening at their lower ends *E*, as shown; and into these water or steam is conveyed by the small pipes *G G*, connected with the boiler at *S S*. The lower ends of the cylinders (see enlarged view, Fig. 2), are like the frustrum of a cone. As the water or steam passes through the annular space *O*, it meets the cinders that are discharged from the pipes *D* and extinguishes all sparks. No water or steam enters these pipes to clog them up, and the stack is always free from any accumulation of cinders and dust.

This plan has been in use for some time on some of the engines of the above-named road, and is said to work admirably. Aside from its value as a spark arrester, it is said to work an important saving in the consumption of fuel, as compared with what is consumed by engines not having the improvement.

AN evaporative test of G. S. Strong's patent heater was recently made on the Chicago & Alton Railroad. The heater was attached to engine No. 50, running between Bloomington and Chicago, the train consisting of seven cars from Bloomington to Pontiac, and six cars from Pontiac to Chicago. The same trip was also made with the same engine and train without the heater, all the other conditions being equal as nearly as possible. The result was that the train with the heater showed a comparative saving of 2,442 pounds of coal, and an increase of 1.09 pounds of water evaporated per pound of coal used.

Railway Traveling in Egypt.

A correspondent of the Cleveland *Leader* writes from Asyoot, Egypt:

The first ride on an Egyptian railway is an experience never to be forgotten by the traveler. I shall always remember my ride from Alexandria to Asyoot over four hundred miles along the sinuous valley of the Nile. My dragoman took me to the depot at Alexandria. I bought my ticket, handing out gold and receiving back change in Egyptian silver marked in Arabic, and being cheated, I suppose, out of half of my fare. I was then shown by a man in a turban and gown into the car, and took my seat among fifty dark skinned Egyptians all in red caps and in oriental dress. In a short time the bell at the depot was rung for departure, and away we went up the valley of the Nile at the rate of thiry miles an hour. The road is as smooth as a floor, and the cars glide over it easier than any I have ever known. There are no grades perceptible, and the plain of the valley stretches for miles in front and behind us. The air is warm, the sun shines gloriously, and we are comfortable in February with the windows open and without either fire or hot water foot-warmers.

There are no country houses off by themselves as in America. The Egyptians, as the Europeans, live in villages. The train stops at one of these and I see my first Egyptian country town. It is not a comfortable looking place. The houses are none over two stories and they are all jumbled together and built of sun-dried bricks. The whole looks as if some one had thrown down an immense handful of mud into this beautiful plain of green. They are all flat roofed, low, and without ornamentation. They display no architectural beauty and are the rudest of the rude.

And then the people. One sees something of them in the crowd that rushes up at the stopping of the train. They are a strange set. Dozens of half-naked men and women rush to the car window, offering cakes and sugar-cane to eat, and water to drink. Some little hard boiled eggs and the water seem to be the most eagerly bought. Water, especially, is in demand, and the water carrier, who has a goat skin filled with it, dispenses it from his back even as they did 3,000 years ago. Sugar-cane is also a prime article of merchandise. It is bought, and sucked for the juice that is in it. At large stations dignified Mohammedans get off and on. Friends come down to meet friends, embracing and kissing each other in the most graceful way; the bustle of putting on and off the the freight increases, and the crowd shows all the different classes and the bright colors of the East.

In the cars a like picture prevails. The third-class cars are patronized by the poorer natives and here the styles are all oriental. The sides of these cars are open, something like an American cattle car, and the seats are plain benches running lengthwise through the car. The second class coaches are substantially the same as those of America, though they are in cleanliness and comfort no better than our smoking cars. In these, people of the better class ride, together with soldiers, merchants and more economical travelers. The first class are built on the European plan of compartments, and are used almost exclusively by foreigners and the very wealthy Turks. None of the cars have the finish of the American. The arms of the seats are of hoop iron and the painting is a plain drab. I have traveled so far second class, as thereby I save about one-half and get to see the people much better. When I came here to Asyoot I was in a car full of Orientals. A tall Egyptian officer in a red cap and an overcoat shining with gold lace and gold buttons sat in front of me. Around his head and neck was thrown a shawl of green, purple and gold, and out of this a most intellectual and finely formed face shone gravely. I remember thinking that such an Othello might easily bewitch many Desdemonas. His servant, whom he called now and then Mohammed, was a pretty well dressed man of intelligent appearance. Young and bright, he wore a cardinal fez with a crimson turban. He also had a shawl thrown over his head and his fierce mustaches set off his copper-colored complexion. Back of this man sat a Greek with a sample case. He was probably a commercial traveler. Among the other passengers there were many curious customs, according to their positions and characters. All of these people I found very polite and very kind. I have been asked a dozen times to eat with persons who were taking their lunches, and at Benishoff the conductor held the train three minutes for me to send a telegram. Ten words for 25 cents, and they were sent 150 miles.

The railroads here are built with iron disks holding the rails in place of ties. They seem to do very well. The rates are but little higher than those of America, and the travel seems to be pretty heavy.

Yard-Masters' Mutual Benefit Association.

The annual convention of this association was held in Baltimore, June 14. The attendance was large. The convention was called to order by the President, Geo. W. Evans, who delivered his annual address. The executive committee reported a very prosperous condition of the association, and a flattering increase in the membership. The committee on constitution and by-laws reported adversely to the adoption of any secret grip, sign or password among the members. The number of members now on the list, exclusive of deceased and forfeited, is 509. Cash balance in the treasury, $597. The committee on signals reported in favor of a uniform system, which would greatly reduce the number of accidents. The yard-masters all over the country were in favor of a uniform code, by which yard and junction work could be more expeditiously accomplished and with fewer accidents. The different uses to which the motions of the lamp are applied would scarcely be believed except upon reading the printed "signal rules," of the various railroads; and taking into consideration the roving habits of most railroad employés, the advantages which would accrue from a uniform code are obvious. An amendment was proposed to the constitution, requiring all persons joining the association to pass a health examination; and also requiring members to report all strikes to the officers of the association, both of which were lost.

The delegates during their stay were entertained by the mayor of the city, and were treated to a complimentary trip down the harbor as the guests of the city. Many of them visited the track-yards of the Baltimore and Ohio road. A visit was made to Washington, and the convention was concluded with a supper. The next meeting will be held at Denver.

The New Baker Car Heater.

We have received from the inventor, Mr. W. C. Baker, President of the Baker Car Heater Co., an illustrated descriptive circular setting forth the merits and explaining the construction of the new heating apparatus recently perfected by him, and designed for the safe and economical warming of passenger cars. As already stated in a brief notice of the invention in our April issue, the object of the new method is to avoid the risk of setting fire to cars in case of train collisions, by having the fire outside the cars instead of inside, while at the same time each car can be warmed independently of the others. This is accomplished by suspending underneath the car just back of the truck a small compact steam generator, consisting of a boiler, fire-pot, ash-pan, etc., inclosed in a fire-proof casing; the whole being in circular form, and occupying a space about 24 inches in height and 30 inches in diameter. The generator is suspended about 9 inches below the car floor, and the same distance above the rails. The quantity of water used is about 8 gallons, and there is very little occasion for renewing the supply. The fire is made and attended to entirely from the outside, and is replenished by

means of two coal chutes, one on each side slanting downwards, and holding coal enough to last one or two days. There are smoke and draft flues, a draft regulator, pressure gauge and safety valve, the location of which can not be correctly indicated without drawings. The safety valve blows off at a pressure of 50 lbs., although 10 lbs. is sufficient to warm the cars in ordinary winter weather. The draft regulator is automatic, and controls the fire by the pressure of steam. It can be set permanently, or adjusted to open or close the draft, and so control the heat in the car. The steam is supplied to the car by radiators, consisting of 2½ inch pipes which run close to the truss planks on each side, and have an inclination downwards towards the boiler so the condensation can run back and be reconverted into steam. At the ends of the pipes are automatic air valves which allow the air to escape, but not the steam. The small portions of the connecting steam pipes that are outside the car, as well the boiler and smoke flue, are protected by weather-proof material. When the fire is out there is no water in the pipes, but only in the boiler, and this being conical in form, no injury can result from freezing.

Aside from the safety of this arrangement in reducing to a minimum, or it may be altogether, the risk of cars taking fire under any circumstances from the heater underneath, there are many other obvious advantages. The fuel, implements, ashes, gas, dust and the attention incidental thereto are removed from the car, and something is also gained in space where space is so valuable and can be made so available. In order to facilitate the making of repairs, a duplicate of each part of the apparatus, duly numbered, is always kept on hand. The circular states that the heater has been fully tested and adopted by the New York Central and Hudson River Road, and that other prominent roads have ordered their passenger cars to be equipped with it.

The Cleminson Flexible Wheel-Base.

A pamphlet has just been published in England setting forth the merits of this system of running gear, and the extent to which it has been applied to railway rolling stock in England and other parts of the world. Although the system was brought to public notice only about six years ago, the pamphlet states that it is now working with complete success on 25 home railways, 95 foreign and 30 colonial lines. Over 4,000 carriages are now running with it, and 2,000 more are being built for the same purpose, besides a large number of engines. The system is peculiarly adapted to the carriages upon English roads, which usually have three pairs of wheels with rigid axles, the object being to do away with this rigid parallelism, and enable the axles in going around curves to assume a position corresponding with the radius of the curve, whatever it may be. This is accomplished by making use of three articulated or jointed axle-frames, constituting a kind of extended truck, the body of the car resting on the center-plates of the two end frames, while the middle one is free to move or slide transversely under the car. In this way each axle assumes automatically its natural radial position to the curve center, and returns to a parallel position on passing from the curve to a straight track. It is obvious that a vast deal of friction and flange wear of wheels and rails are avoided by this flexibility of the wheel-base, to say nothing of easier draft. We, however, on this American side of the water, must be content to admire this arrangement at a distance. Our cars are so much longer and heavier, and the advantages of our rigid trucks with their short wheel-base have been demonstrated on such an immense scale of operation and for such a length of time, that it is extremely improbable that they will ever be superseded by any practicable plan for securing the same flexibility to the wheel-base which Mr. Cleminson has been so successful in applying to foreign cars.

Tubular Iron Freight Cars.

The United States Tube Rolling Stock Company have had an iron tube car built at the car works of Schall & King, Middletown, Pa., corresponding in size and dimensions with Series E, long gondola drop-bottom standard of the Pennsylvania Railroad, which is a wooden car weighing about 22,500 pounds. The tube car, however, weighs only 18,800 pounds, and, as a trial test of its capacity, it was loaded with 53,200 pounds of pig iron, making the total weight of car and load 72,000 pounds. The car, with this enormous load, was then run over rough sidings, switches and frogs, at Middletown, and subjected to exceedingly rough usage for several hours. When the load was removed the car was thoroughly examined and measurements carefully taken and each yielding portion of the car was found to have returned easily to its place, indicating that its capacity had not been in any manner strained. The car was then delivered to the Pennsylvania Railroad, at Altoona, for the purpose of being put into service and subjected to such ordeals as may be devised for obtaining conclusive information in regard to its adaptation to the requirements of the class of cars which it represents.

This car is said to be an improvement upon the iron gondola cars designed by the same company, and built at the Gilbert & Bush car works, in Troy, a few months ago. It is claimed that the new or rather modified construction, produces a car which is from 3,000 to 5,000 pounds lighter than cars of the same capacity having wooden frames, and that by dispensing with the bulk of wooden material necessary to furnish the requisite strength, the body of the car is lowered from four to five inches, thus bringing the center of gravity that much nearer the rails, and this without interfering with the tracks. The draw-bar, instead of being below the end-sill, is made to project through it in the direct line of draft, so that the lowering of the frame of the car does not bring the draw-bar below the standard height above the rail. Another feature of the draft arrangement is the running of the rods through the two inside pipe sills, thus transferring the draft strain to the rear end-sill and forming a continuous draw-bar. There are a number of other economical advantages claimed as compared with the ordinary wood framing, and which are familiar to all who have noted the progress of iron car construction during the past ten or twelve years. The material consists of the combined use of wrought-iron pipes, channel iron, malleable iron clamps or fastenings, and iron bolts.

The performance of this test car in regular service on the above-named road will be watched with interest. The previous performances of iron cars of a similar construction have not been such as to justify their general introduction as being more economical than wooden ones. The model iron or steel car is, in our judgment, yet to be built, and when it is built, the metal of which it is composed will not be mainly, if at all, in the form of circular tubes. Precisely what the form or combination of forms will be we are unable to say. That will have to be determined by a much greater amount of experimental construction and practical service than has yet taken place.

Iron Frames for Cars.

The use of wrought-iron tubes has been urged for such work as car bodies and framing with a persistency which is worthy of a better cause, to say the least of it. It is true that a few cars have been made for the sake of showing how tubes can be put together into the semblance of car frames, but a careful analysis of the conditions of this use of tubes will show that the weight of metal thus employed could be placed to a very much better advantage if the simpler L, U, T or I form of bar had been used. These rectangular forms (as distinguished from the circular) can be had in such a very wide range of sizes in iron, and to an important and increasing extent in steel, that any conceivable combination of parts, or proportions of parts, can be made at pleasure, so that it can hardly be claimed that the undesirable or the really bad features of the circular tube combinations need be introduced into any structure merely for the sake of utilizing the special advantage which the tube no doubt affords in resisting compressive strains in the direction of its length.

Even if there were no other reason for using the rectangular forms of structural iron and steel this would be sufficient, that all the needful joining of one part of a frame to another can be made at a very much less cost than when circular outlines are employed, for all the surfaces of contact are flat, and hence one or more pieces may be laid upon another and a bolt or rivet passed through the whole with the utmost readiness. This is a consideration of the highest importance when the weight and cost in material and labor of a piece of work is to be estimated or determined.—*Iron Age.*

The Master Mechanics' Association.

There was a very full attendance at the Master Mechanics' Convention, at Niagara Falls, on the 20th ult. At the regular roll-call, 38 members answered to their names, and 10 new members were subsequently admitted. An elaborate paper on improvements in boiler construction, by Mr. Reuben Wells, of the Louisville & Nashville road, was read and discussed; also the question as to what is the maximum limit of weight allowable per wheel for locomotives. We have at this present writing received no regular connected report of the proceedings, but will hereafter publish such portions as are of special interest, so far as our space will permit.

The members of the convention were entertained by a complimentary "hop," given by the proprietors of the International Hotel. A reception was also given on the following evening, and free carriage were provided to all points of interest in the vicinity. The following locomotive works contributed to the entertainments: The Brooks; Baldwin; Rogers; Schenectady; Cooke; Pittsburg; Rhode Island; Grant; Taunton; Mason; Manchester; and Dickson. Also the following manufacturers: Crerar, Adams & Co.; Norway Iron Works; Manning, Maxwell & Moore; Ashcroft Manufacturing Co.; Consol. Safety Valve Co.; L. G. Tillotson & Co.; F. S. Pease; Murphy Varnish Co.; L. B. Flanders Machine Co.; Standard Steel Works; Nashua Steel Works; Midvale Steel Works; Otis Iron & Steel Works; Nathan & Dreyfus; W. W. Snow; Ashton Valve Co.; Thomas Prosser & Son; Galena Oil Works; J. C. Sibley; J. A. Williams & Co.; Post & Co; Geo. R. Meneeley; Allen Paper Wheel Co.; National Tube Works; H. A. Rogers, A. French & Co.

These were represented by the following Executive Committee: H. G. Brooks, Chairman; Chas. T. Parry, Aretus Blood, Charles Ellis, R. S. Hughes, William Berdan, M. A. Herrick, William Burnham, I. K. Bole, Charles A. Moore, H. G. Ashton, Edward S. Shepherd, F. S. Pease, H. A. Rogers, General Greeley, Charles Miller, M. L. Hinman, and William Toothe, Treasurer.

THE presence of an ex-President of the United States, and high railroad officials, is no guarantee of safety to fast running trains; witness the accident on the Long Branch road on the 29th ult.

NATIONAL CAR BUILDER

PUBLISHED MONTHLY
BY
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MORSE BUILDING.....NEW YORK.

JAMES GILLET, Editor.
L. E. WATERMAN, CORRESPONDING EDITOR.

JULY, 1882.

CONTENTS.

EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of the month.*

SUBSCRIPTIONS *to the* CAR-BUILDER *will be received, and copies kept for sale, at the following places:*
A. WILLIAMS & Co., 283 *Washington St., Boston, Mass.*
L. SCHAFFNER, *Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.*
WILLIE H. GRAY, 306 *Olive Street, St. Louis, Mo.*
ROBERT CLARKE & Co., 65 *West Fourth Street, Cincinnati, Ohio.*

READERS AND CORRESPONDENTS are requested to bear in mind that the address of the CAR-BUILDER is "*Morse Building, New York, N. Y.*"

THE CAR-BUILDERS' CONVENTION.

The recent meeting of the Car-Builders, in Philadelphia, was a more encouraging one than any that has been held since the association was organized fifteen years ago. The number of members in attendance was larger than usual, and they went about their work in a way that indicated that something like a crisis in the history of the organization was impending. And this was really the case, as we shall see further on. The standing committees were nearly all of them ready with their reports, and although they were not, with one marked exception, of very great length, nor were the several topics, except that of screw-threads, treated with the thoroughness that might be desired, the views expressed were more decided and outspoken and less tame and apologetic than formerly.

It would appear from the report of the committee on the subject that the practicability of train brakes for freight cars has been fairly demonstrated, and although the committee does not designate any one of the devices that are now being tried as fully answering all the requirements, it speaks of several that are already in successful operation, and suggests that railroad companies would do well to make a selection from these, and in that way test their comparative merits. Considering the difficulties to be overcome, it is a great step gained to have any train-brake devices at all from which a selection can be made—a fact that is highly creditable both to the committee and to the inventors.

The buffer-block question was reported upon by two committees, and was the subject of a lively discussion. There was a slight disposition to temporize and put off, but the suggestion that legislative interference was highly probable unless some specific recommendations were made by the convention, had the effect of putting members on

their mettle, and forcing a decision in reference to the sizes of single and double blocks so as to avoid interlocking when the two come together.

The report of the committee recommending an increase of the carrying capacity of freight cars to 30 tons was the subject of an animated discussion, in which the opponents of such increase appeared to have the best of the argument. It was urged that in this matter it would be better to hasten slowly, in view of the change which such a step would necessitate in the dimensions of axles, weight of wheels, capacity of bridges, and the liability to increased friction and heating of journals.

The committee on brake-shoes, which last year labored under the impression that it was constitutionally debarred from recommending patented devices, makes an unqualified recommendation this year that the "Christie" brake-head and shoe be adopted as the master car-builders' standard. It is a patented invention, but it is said that the patent will expire in a few months. What the chances are for a renewal is not stated. The committee also express the opinion that it is better to apply brakes to all the wheels of freight cars than to a less number.

In view of the great importance of the subject, we print in full the elaborate report presented by Mr. Forney, from the committee on Screw-Threads. It is deserving of the attention of every one who has any thing to do with the construction and maintenance of railway rolling stock, or who appreciates the advantages to be derived from the use of bolts and nuts, the threads of which are so accurate and uniform as to make them practically interchangeable. The committee recommend that a set of the Pratt & Whitney Co.'s unhardened gauges be kept by the Master Mechanics' and Car-Builders' associations as standards for reference, and that the members of each abandon the use of screws larger or smaller in diameter than the sizes specified for the Sellers or Franklin Institute system.

The most important work of the convention, however—the "crisis," to which we have referred—was the adoption of the proposed amendment to the constitution of the association, providing for the admission of representative members commissioned by the road companies, and who are to vote on the basis of the number of cars owned by such companies, on questions relating to standards of construction and the expenditure of money. The large number of favorable responses from the chief officials of the roads, expressing their willingness to send such representative members, caused the amendment to be adopted without any formal dissent and with very little discussion. That it is a new departure for the association, and one that will ultimately place it on a better footing by establishing relations between it and the roads that can hardly fail to promote its efficiency, does not admit of a reasonable doubt. If we assume what is highly probable, that the association will hereafter be composed almost exclusively of representative members, and that all of them, or nearly all, will be practical car-builders, it is easy to see that whatever it may say and do will be attended with a sense of responsibility which will insure better work than it has been able to accomplish in the past, and that this responsibility will be shared in a measure by the railroad companies. The freight business of the country is increasing at such a rate that in a few years a million of cars will be required to meet the demands for transportation, and it is to this branch of the service that the Car-Builders' Association will have to give its attention almost exclusively. It will have to determine what is the *best* construction, and how to secure the nearest approximation to uniformity so as to render the parts of cars interchangeable as far as possible. Whatever it may do in its representative character to secure these results, must be, as heretofore, in the form of recommendations. The responsibility for the rest will be with the managing officers of the roads, just as it has been in the past, and these officers will be pretty apt to do what may seem to them to be best for the interests of the properties under their control, independently of any outside opinions or suggestions. There is no compulsion in the matter.

Improvements in the construction of freight cars, and the doing away with the ridiculous and costly diversity which has been harped upon so much, and which is fairly illustrated in the existing varieties of couplings, journal-brasses and brake-shoes, will be brought about just as fast as imperative necessity requires. The Association can be made a most effective instrumentality in this respect by agitating the subject, and presenting to managers from the stand-point of practical experience acquired in the car departments clear ideas of the millions that are sacrificed every year by the chaos which now prevails in these details of construction. The necessity of some concerted movement among railroad companies is becoming more imperative every year. A few years ago there was a war about track gauges. Now there is almost entire uniformity, some roads voluntarily incurring great expense to save themselves from unprofitable isolation. It is not now a question whether an inch or fraction of an inch, more or less, is absolutely the best, but there must be a gauge that will permit an interchange of traffic. That is imperative; and a greater uniformity in the parts of freight cars is every day becoming equally so. The only difference in the two cases is that the conditions of car uniformity are much more complicated and difficult to deal with.

The association will meet at Niagara Falls, October 10, for the purpose of perfecting the reorganization and making any additional changes in the constitution that may be considered necessary. Representative members will be in attendance.

REPORT ON THE SPUYTEN DUYVIL ACCIDENT.

The committee of the New York Senate appointed to investigate the Spuyten Duyvil accident have made a report. Considering the interval between the date of the appointment of the committee and the date of the report—a period of more than four months—it can not be said that anything very remarkable has been accomplished in respect to the conclusions to which the committee have arrived. The report, as a whole, is wordy, tame and commonplace, and reads very much like a perfunctory performance that is not expected by its authors to excite any special interest. The particulars of the accident are stated in detail, and do not differ materially from the newspaper accounts published at the time. The blame is laid on the engineer of the Tarrytown train and the conductor and brakemen of the Albany train, collectively, for not obeying written and specific instructions. No sufficient evidence has been obtained to justify the suspicion that the brake-cord was tampered with by passengers in the cars. The fire is believed to have originated from the broken stoves or from the car lamps. The committee find no fault with the existing rules and regulations of the road for securing safety to passengers, but think they are quite sufficient, provided they are strictly enforced. No additional legislation is recommended, except in a general way, and in such vague terms as to amount to nothing. The opinion is expressed that the State should not assume directly or otherwise any part of the responsibility devolving upon railroad managers of providing for the safety of railroad transportation, especially when there is reason to doubt as to what are the safest and best means to be adopted. While it is deemed unwise to prescribe what particular kinds of machinery and appliances shall be made use of, the committee venture to suggest that no unnecessary risks shall be incurred and that the precautions which the public have a right to demand shall not be neglected.

The committee advance the opinion that the companies exercise more care in respect to the safety of passengers than they do for their own employés in the freight departments, but nothing very definite is recommended in the way of a remedy, except the use, as far as possible, of mechanical means in the place of human agency, as illustrated in interlocking signals, block systems and the like. The report concludes by commending the enterprise and diligence of the New York Central & Hudson River Company in the adoption of suitable appliances for the safety of passenger travel.

COLOR-BLINDNESS.

This visual defect, which remained so long undetected as a serious disqualification of railway employés for the proper discharge of their duties, is found to be more complicated and difficult to define the more the subject is investigated. The professional experts have now taken it in hand, and instead of finding it a simple matter that can be definitely determined by the "colored-worsted" test, it is found to be no simple matter at all, and that mere laymen are entirely incompetent to deal with it. Plain people of average intelligence, who can easily detect a hole through a ladder, are completely bewildered with the technical jargon of the professional discussions as to what color-blindness really is, and as to the most infallible and certain means of detecting its existence. The trained skill of experts is declared to be indispensable, and these experts must be no other than ophthalmic surgeons of first-rate capacity, in order to discover the various sources of error and to separate the phenomena of veritable color-blindness from the mere ignorance of the names of color. It would seem also that the general run of ophthalmic surgeons, in order to be competent examiners, must have a special training for the purpose, inasmuch as a competent examiner is not made in a day or a month. And, furthermore, it is alleged that the number of these surgeons, and especially those of the requisite training, is limited, and bears in the aggregate no proportion to the mass of employés in the service of the great leading lines of railroad. Not only must each new applicant for employment be thoroughly examined, but the visual capacity of those in regular and continuous service must be periodically tested, lest it should become impaired, to the great hazard of life and property.

It is manifest that the more this matter is given into the hands of the professional guild, the more it will be magnified until it assumes an aspect out of all proportion to its importance. A host of experts will have to be educated and qualified by special training to meet the requirements of railroads. Their name will be legion, and the footing of the bills will be no bagatelle in the items of annual expenditure. There is such a thing as abnormal vision, and an incapacity of certain persons to discriminate colors in the same way that the great majority of people do. There is, however, no standard of judgment in the matter except an assumed one. Every person's perception of color is supposed to be normal until it is found to be different from another person's perception; and if it shall come to pass that every railroad company shall be compelled by law to maintain a corps of ophthalmic experts to inspect the eyes of its employés, it may possibly be necessary, as an additional safeguard, to have another corps of more highly-trained professionals to look after the visual capacity of the experts, and still another to look after the latter corps, and so on. Movements of this kind are very apt to run into extremes, especially if there is a good chance for "hire and salary" and lucrative employment. This tendency might be justified, however, as being an error on the safe side, if there was extant any clear and satisfactory evidence that any considerable number of railroad accidents, or a single one even, in which lives have been lost, have been caused by a defective perception of color.

CONTRACT WORK AND ROLLING STOCK.

A correspondent whose letter we print in another column takes the ground that the best cars and locomotives are those which are built in the regular road shops. As a rule this may be so, but it would be unjust to infer from this that all contract work as respects engines and cars is inferior. A prejudice has always existed against what are called "contract" cars, and they are often referred to as being necessarily of a poorer quality, both as regards material and construction, than those built by the roads in their own shops. The reason is obvious. Contract work is usually given to the lowest bidder, and like houses built by the job, the work is apt to be slighted so as to save the largest possible margin of profit. People do not build houses, nor cars, nor locomotives, for the mere love of work, but to make a living and lay by a little for old age and other contingencies. If shoddy work is turned out of contract shops, it is because the price paid for it will not warrant any thing better. No contract builder is so ambitious of acquiring a bad reputation as to build cars or locomotives that will not stand the test of ordinary service. The profit being the same, he would doubtless prefer to turn out good work rather than poor. It is frequently the eagerness of road managers and superintendents to drive bargains that will make a good show in the annual reports, that leads to reckless underbidding and the consequent cheapening of work and material. No builder can afford to turn out first class work for second-class pay, nor does the purchaser, as a rule, get any more than he pays for. Indeed, he is pretty sure to get less than he pays for whenever he fails to discriminate between cheap things that are sure to prove costly, and costly things that are sure to be cheap.

It is easy, of course, to put poor iron in locomotives, and conceal defects in construction with paint and other devices, and even tone down the inspection with a profusion of hospitality and good cheer. But such practices will not pay in the long run. The fact that many road companies are desirous of building more of their locomotive stock than they have hitherto done is doubtless owing to the difficulty during the past year of getting orders promptly executed by the regular manufacturers, and also to a desire to build their engines in their own way with a view to remedying particular defects that have become apparent in practice. But when the cost is footed up, it will, we think, be found to exceed contract prices; and, as an offset to this, the engines will doubtless prove to be more serviceable. There is such a thing, however, as carrying economy too far in this direction. We were on a train not long ago drawn by a home-made locomotive on a first-class road, when one of the side-springs (also home-made) suddenly broke. The train proceeded slowly for a few miles, when a freight engine was pressed into service until a station was reached, where it was replaced by a passenger engine. The failure of the spring was attributed to the fact that it was made in the road shops and not by a regular manufacturer.

THE NEW YORK RAILROAD COMMISSION.

The bill which has recently become a law by the approval of Gov. Cornell, provides for the appointment of a Board of Railroad Commissioners, to consist of three competent persons, who shall be appointed by the Governor by and with the advice and consent of the Senate. The appointments are to be made within ten days after the 3d of January next. One of these persons is to be selected from the party which casts the greatest number of votes for Governor at the next election; another one from the party which casts the next greatest number of votes at the same election; and the third one is to be selected upon the recommendation of the officers of the Board of Trade, Chamber of Commerce, and the National Anti-Monopoly League. Subsequent appointments to fill vacancies are to be made by the Governor with the approval of the Senate. The annual salary of each commissioner is to be $8,000. The total annual expense of the Board, including salaries, is not to exceed $50,000, and such expense is to be assessed upon the railroads. The commissioners and their employés are prohibited from soliciting or receiving from any railroad any place, position, gift, free passes or gratuities of any kind.

The text of the law reads, in fact, as if the persons who drafted it were conscious that they were engaged in the

important and delicate business of opening up a new sluice for the flow of patronage and official spoils, and that it was highly desirable to start with a square deal. The thoughtful and considerate way in which the commissioners are to be selected will strike every body as extremely judicious—a skillful fusing of elements that might otherwise become discordant and insist upon a more equitable distribution of the fat. The provisions of the laws are also very rigid in guarding against the insidious and demoralizing influence of gratuities and favors, even to the small matter of passes; so it may be counted on, that when this machine gets fairly under way, the railroad corporations of the State will be put upon their good behavior in all their dealings with the public and with one another.

Exhibition of Inventions and Appliances at the Car-Builders' Convention.

The exhibit of models and manufactured articles belonging to the general category of railway machinery and supplies, at the recent session of the Car-Builders' Convention at Philadelphia was more extensive than any similar exhibit in previous years. The following are the names of some of the principal exhibitors:

HOOPES & TOWNSEND, Philadelphia, Pa.—Cold-Punched Nuts, Bolts, Washers, Rivets, Screws, etc.

PHOSPHOR-BRONZE SMELTING CO., Philadelphia.—Bearings for Locomotives, Cars, Machinery, etc.

HOOKS SMELTING CO., Philadelphia.—Bronze and Composition Locomotive Bearings, and Railway Supplies.

GLOBE VENTILATING CO., Troy, N. Y.—Car and Depot Ventilators, and Dust and Cinder Deflectors

VULCANIZED FIBER CO., Wilmington, Del.—Hard and Flexible Vulcanized Fiber for Dust-Guards, Oil-Box Covers, etc.

GEO. R. MENEELY & CO., Troy, N. Y.—Hopkins Lead-Lined and Bell Metal Journal Bearings.

RAMAPO WHEEL & FOUNDRY CO., Ramapo, N. Y.—Raoul Journal Box for Railway Cars.

STANDARD STEEL WORKS, Philadelphia.—Locomotive and Car Wheel Tires.

POST & COMPANY, Cincinnati.—Car Lamps and Trimmings.

WILSON, WALKER & CO., Pittsburg, Pa.—Car and Locomotive Forgings.

PRATT & WHITNEY CO., Hartford, Conn.—Taps, Dies and Gauges.

J. B. SAFFORD, Buffalo, N. Y.—Safety Draw-Bar for Freight Cars.

BUDD & ELLIS, New York and Boston.—Wrought Iron Steel-Tired Car Wheels, of Wednesbury, England.

MIDVALE STEEL CO., Philadelphia.—Tires, Axles and Forgings.

A. S. JENKS & SON, Philadelphia.—Instantaneous Steam Generator.

GRAVITY LOCK CO., New York.—Gravity Locks for Cars, Warehouses and Sliding Doors.

DELL & JOSEPH C. NOBLIT, Philadelphia.—Railway Upholstery Goods.

LONGBRIDGE & BOND, Philadelphia.—Sewer Pipe, Fire Clay, Tile and Cement.

WM. SELLERS & CO., Philadelphia.—Machine Tools.

CONGDON BRAKE SHOE CO., Chicago.—Improved Railway Car Brake Shoe.

WILLARD H. SMITH, New York.—Improved Car Lamps, Reflectors and Ventilators.

ELKINS MANUFACTURING & GAS CO., Philadelphia.—The Ajax Metals for Journal Bearings.

UNITED STATES CAR CO., Boston, Mass.—Screw Lever Gondola Dumping Car.

NATIONAL RAILROAD SUPPLY CO., Philadelphia.—Journal Box Lubricating Pump.

SUSPENSION CAR TRUCK MFG. CO., New York.—Suspension Car Truck for Freight and Passenger Cars.

BAKER CAR HEATER CO., New York.—New Baker Low-Pressure Steam Car Heater.

ORMSBY SASH-HOLDER CO., Boston, Mass.—Car Sash-Holder and Lock.

F. W. QUITMAN, South Norwalk, Conn.—Sash-Holder for Car Windows and Shade Screens.

A. FRENCH & CO., Pittsburg, Pa.—Spiral Springs for Railway Cars.

KEYSTONE CAR SPRING WORKS, Philadelphia.—Railway Car Springs.

C. W. PICKERING & CO., Philadelphia.—Railway Car Springs.

CLIFF & RIGHTER CO., New York.—Railway Car Springs.

UNITED STATES CONCAVE SPRING CO., New York.—Concave Elliptic Springs.

ALLEN MIDDLETON, Philadelphia.—Denison's Cooling and Lubricating Compound.

HALE & KILBURN MFG. CO., Philadelphia.—Rattan Car Seats and Seat-Back Springs.

NOYES MANUFACTURING CO., Boston, Mass.—Liquid Cooler and Compound Lubricator.

GEORGE BUTLER, Cincinnati, O.—Excelsior Draw-Bar Attachment and Spring Protector.

N. O. PARKS, New York.—Flints' Lubricating Pad for Car Journals, Railroad and Machinery Oils.

D. F. VAN LIEW, Aurora, Ill.—Improved Car Door Hanger.

A. M. GRANGER, Boston, Mass.—Fire Extinguishing Apparatus for Railway Trains.

GOODELL & WATERS, Philadelphia.—Wood-Working Machinery.

ATWOOD SAFETY NUT CO., Springfield, Mass.—Atwood Safety Nuts.

LEIB LUBRICATING CO., Buffalo, N. Y.—Dux Lubricant, or Railroad Axle Grease.

AMERICAN LUBRICATING CO., Philadelphia.—Car Axle Lubricators.

TALLMAN AUTOMATIC CAR BRAKE CO., New York.—The Tallman Automatic Brake.

PAIGE'S WROUGHT METAL CAR WHEEL CO., Springfield, Mass.—Wrought Iron Car Wheels.

J. C. FINN & SON, Philadelphia.—Linerusta-Walton Wall Decoration.

S. A. V. HARTWELL, Valley Center, Kan.—Automatic Car Coupler.

W. V. PERRY, Chicago, Ill.—Safety Freight Car Coupling.

WAPAKONETA AUTOMATIC CAR COUPLING CO., Wapakoneta, O.—Patent Automatic Car Coupling.

G. H. AMES.—Car Coupler.

J. N. BEST, Denver, Col.—Freight Car Coupler.

JOHN C. VANLOHE, Providence, R. I.—"Salamander Fire Deffer."

R. A. COWELL, Cleveland, O.—Platform and Buffer for Railway Cars.

ALLEN PAPER CAR WHEEL CO., New York.—Paper Car Wheels.

G. F. GODLEY, Philadelphia.—Double Elastic Conitnuous Draw-Bar for Railway Cars.

GARDNER & CO., New York.—Perforated Car Seats.

THE Cincinnati, New Orleans & Texas Pacific road has built a new boiler shop at Chattanooga, Tenn., and equipped it with the latest improved machinery, including a steam punch and shears and a flange fire 7 feet long. The first boiler built is 48 inches inside diameter, and has 143 2 in. flues 10 ft. 8½ in. long. The holes for the seams are punched ¾ in. for the inner course, and 1⅛ in. for the outer one. The courses are then bolted together, and the holes drilled to a perfect fit with a 1⅛-in. drill from the inside. The switching engine for which this boiler is built will have cylinders 18×24 in. and 6 drivers, connected, 50 in. in diameter, with a separate tender having a sloping back-end. This road equips engines with 2 injectors and no pumps, and is attaching the American steam brake to all its freight engines. It has several Mogul engines. They have cylinders 18×24 in., 50-in drivers and weigh 85,000 lbs. The car shops are building a new passenger car, rebuilding two coaches and one caboose, and turning out an average of ten gondolas a week.

KNIGHT'S MECHANICAL DICTIONARY.—Houghton, Mifflin & Co., of Boston, announce that they have in press, and will issue during the present year, an entirely new supplemental volume of this work, to be completed in four sections of 240 pages each, and containing entirely new matter illustrated with 2,500 engravings. Judging from the specimen pages sent us, the new volume will be a valuable addition to the original work, and as such will be appreciated by all readers who are interested in the progress of mechanical science. For further particulars the publishers may be addressed as above.

DURING the three days' session of the Car-Builders' Convention, there was very little time lost in excursioning and sight-seeing. The business in hand was too important to admit of interruption from the outside, and the members carried out the principle of work first and play afterwards. After the adjournment, visits were made to the Baldwin Locomotive Works, the shops of Wm. Sellers & Co., the Hook Smelting Works and other places of interest. On Friday the members went on an excursion to Atlantic City by the West Jersey road, at which place they were entertained with a dinner. The hospitalities extended to the association were conducted under the supervision of the following committees, representing a number of the manufacturers of Philadelphia, and others:

Executive Committee.—J. B. Ecclesine, Jr., Andrew Wheeler, Dell Noblit, James M. Hibbs, H. S. Hale, George Buntin, W. F. Griffitts, D. L. Sylvester, Thos. S. Harrison.

Finance Committee.—James M. Hibbs, Dell Noblit, Andrew Wheeler, C. S. Bement, W. C. Allison.

Banquet Committee.—Clement R. Hoopes, J. W. Hoffman, George W. Elkins, George Buntin.

Transportation Committee.—W. F. Griffitts, Dell Noblit, J. B. Ecclesine, Jr.

Printing Committee.—H. S. Hale, C. H. Howell, G. M. Brill, J. B. Ecclesine, Jr., A. J. Wright.

RENDLE'S ELECTRIC PAINT REMOVER is the name of a new and very effective preparation for the removal of old paint from wood and metal surfaces, without recourse to the old method of burning and scraping. The preparation is almost instantaneous in its action, dissolving and loosening the paint so it can be washed off with water, leaving the original surface bright and clean. The "remover" is warranted to be absolutely free from lime or other ingredient that is injurious to the most delicate surfaces of wood or iron. The most thorough experimental tests have been made of its qualities, and it is found to be equally effective for the removal of varnish, tar, grease, smoke and stains of every description. Circulars containing full description and directions for using can be had by applying to Arthur E. Rendle, 7 Warren street, New York.

Railroad Sociability.

"Speaking about the sociability of railroad travelers," said the man with the crutches and a watch-pocket over his eye, "I never got so well acquainted with the passengers on a train as I did the other day on the Milwaukee & St. Paul Railroad. We were going at the rate of about 30 miles an hour, and another train from the other direction telescoped us. We were all thrown into each other's society and brought into immediate social contact, so to speak.

"I went over and sat in the lap of a corpulent lady from Manitoba, and a girl from Chicago jumped over nine seats and sat down on the plug hat of a preacher from Lacrosse, with so much timid, girlish enthusiasm that it shoved his hat clear down over his shoulder.

"Everybody seemed to lay aside the usual cool reserve of strangers, and we made ourselves entirely at home.

"A shy young man, with an emaciated oil-cloth valise, left his own seat and went over and sat down in a lunch basket, where a bridal couple seemed to be wrestling with their first picnic. Do you suppose that reticent young man would have done such a thing on ordinary occasions? Do you think if he had been at a celebration at home that he would have risen impetuously, and gone where those people were eating by themselves and sat down in the cranberry jelly of a total stranger?

"Why, an old man who probably at home led the class-meeting, and was as dignified as Roscoe Conkling's father, was eating a piece of custard pie when we met the other train, and he left his own seat and went over to the other end of the car and shot that piece of custard pie into the ear of a beautiful widow from Iowa.

"People traveling somehow forget the austerities of their home lives, and form acquaintances that sometimes last through life."

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Boston, Hoosac Tunnel & Western.—Wm. V. Reynolds has been elected General Manager. Office at Mechanicsville, N. Y.

Canada Southern.—Robert Potts is appointed General Master Car-Builder, with office at St. Thomas, Ont., in place of John Ortton, resigned.

Cincinnati, Selma & Mobile.—Daniel McLaren is appointed General Superintendent, vice A. M. Fowlkes.

Chicago, Burlington & Quincy.—Godfrey W. Rhodes has been appointed Superintendent of Motive Power and Machinery, with charge of the locomotive and car departments. His office will be at Aurora, Ill.

Chicago, St. Louis & New Orleans.—W. P. McKinley has been appointed Superintendent of the Southern Division, vice E. D. Anderson, Acting Superintendent.

Detroit, Grand Haven & Milwaukee.—G. R. Nash is in charge as Manager, in place of John Burton, resigned.

Florida Southern.—H. S. Ming has been appointed Superintendent in place of N. R. Gruelle, who is now Chief Engineer and Superintendent of Construction. J. W. Roberts is Master Mechanic.

Hanover Junction, Hanover & Gettysburg.—Hugh D. Scott is appointed General Superintendent in place of Henry A. Young, resigned.

Housatonic.—W. H. Yeomans has been appointed Superintendent in place of L. B. Stillson, resigned.

Louisville, Evansville & St. Louis.—Webster Snyder, well-known as General Superintendent of the Union Pacific during its construction, has been chosen General Manager.

Marietta & North Georgia.—C. E. Adams, of Boston, Mass., has been appointed Superintendent.

Midland North Carolina.—J. W. Andrews, late Asistant Superintendent, has been appointed General Superintendent, in place of J. B. Yates, resigned.

New York & New England.—A. K. Mansfield is Superintendent of Motive Power, vice George E. Boyden, resigned.

Northern Central.—A. O. Dayton is appointed Superintendent of Motive Power of the Canandaigua, Elmira, Susquehanna & Shamokin Division, in place of R. H. Soule, and John M. Wallis succeeds Mr. Dayton as Superintendent of Motive Power of the Baltimore Division.

Northern Pacific.—S. R. Ainslie has been appointed Superintendent of the Yellowstone Division, with office at Glendive, Montana. S. L. Bean is Master Mechanic. H. J. Small is Acting Master Mechanic of the Minnesota & St. Paul Divisions, vice A. P. Farrar, resigned; office at Brainerd, Minn.

Pennsylvania.—A. O. Dayton is appointed Superintendent of Motive Power of the Philadelphia & Erie Division, in place of R. H. Soule, who has been transferred to the Pittsburg, Cincinnati & St. Louis.

Philadelphia & Atlantic City.—F. S. Urie has been appointed Superintendent in place of Ellis Clark, resigned.

Pittsburg, Cincinnati & St. Louis.—R. H. Soule, now on the Northern Central, will succeed Godfrey W. Rhodes as Superintendent of Motive Power.

Rock Island & Mercer County.—H. B. Ludlow is appointed Superintendent. He is also Assistant Superintendent of the Rock Island & Peoria Railroad.

Sciota Valley.—Richard Bromley has been appointed Master Mechanic, in place of C. G. Browning, deceased.

St. Paul, Minneapolis & Manitoba.—Hubbard C. Atkins is appointed General Superintendent. He has been for some time Superintendent of the Chicago, La Crosse and Prairie du Chien divisions of the Chicago, Milwaukee & St. Paul Road.

Southeastern, of Canada.—P. A. McKinnon, Assistant Manager, is appointed Superintendent and Traffic Manager also, in place of R. A. Alden, resigned.

Texas & Pacific.—J. S. Noble, heretofore Superintendent of the Transcontinental Division, has been appointed Superintendent of the Rio Grande Division. J. L. Thorn succeeds Mr. Noble as Superintendent of the Transcontinental Division.

Wisconsin Central.—A. A. Allen is appointed Superintendent of the Milwaukee and Eastern divisions in place of Charles F. Dutton, appointed General Superintendent of the Milwaukee & Northern.

Employment.

Advertisements will be inserted under this heading for one dollar for each insertion.

WANTED.—A position as Master Car-Builder, or General Foreman of a railroad car department, or as Shop Inspector of Rolling Stock under construction, or as Car Tracer. Satisfactory references given as to capacity, etc. Would prefer a position at the South or Southwest. Address "H," office of NATIONAL CAR-BUILDER.

Mr. Thurber is a "bigger man than old Grant."—*St. Louis Railway Register.*

"'Tis distance lends enchantment to the view"—if it is the oleomargarine man you refer to.

DIRECTORY

of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments.

A

Adirondack R. R. 4-8½ gauge 62 m. 3 lo. 62 cars.
C. E. Durkee, Supt .... Saratoga, N. Y.
Jacob Myers, M. M. .... Saratoga, N. Y.
Jas. J. Travers, M. C. B. .... Saratoga, N. Y.
Alabama Great So'n R. R. (See Cin., N. O. & T. P.)
Albany & Susquehanna R. R. (See D. & H. Canal Co.)
Albert Ry. 4-8½ g. 51 m. 3 lo. 32 cars.
G. A. Robinson, Manager .... Hillsboro, N. B.
Jas. McKay, M. M. & C. B. .... Hillsboro, N. B.
Allegany Central R. R. 3 gauge 30 miles.
Geo. D. Chapman, Gen. Man. .... Angelica, N. Y.
W. O. Chapman, Gen. Supt. .... Friendship, N. Y.
Allegheny Valley R. R. 4-9 g. 259 m. 75 lo. 1968 c.
David McCargo, Gen. Supt. & Pur. Agt.; and
C. B. Price, Supt. (Riv. Div.) .... Pittsburg, Pa.
A. A. Jackson, Supt. (L. G. Div.) .... Brookville, Pa.
Geo. W. Glass, M. M. .... Verona, Pa.
R. Gunning, M. C. B. .... Verona, Pa.
Alliance & Lake Erie R. R. 3 g. 30 m. 3 lo. 112 cars.
W. E. Lewis, Gen. Man. .... Alliance, O.
C. C. Dorman, M. M. & M. C. B. .... Alliance, O.
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, Supt. & Pur. Agt. .... Annapolis, Md.
John L. Beall, M. Mach. .... Annapolis, Md.
Arkansas Midland R. R. 3-6 g. 48 m. 4 lo. 45 cars.
A. H. Johnson, Pr. & Gen. Man. .... Helena, Ark.
J. B. Johnson, M. M. & M. C. B. .... Helena, Ark.
Ashland Coal & Iron Ry. 4-8½ g. 14 m. 7 lo. 425 c.
Douglas Putnam, Jr., Gen. Supt. .... Ashland, Ky.
Robt. Peebles, Pur. Agt. .... Ashland, Ky.
E. M. Roberts, M. M. .... Ashland, Ky.
Ashtabula & Pittsburgh Ry. (See Penna. Co.)
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c.
Jas. Anderson, Supt. & Pur. Agt. .... Spart'b'g, S. C.
Wm. Platt, M. M. .... Spartanburg, S. C.
W. B. Brown, M. C. B. .... Spartanburg, S. C.
Atchison, Topeka & Santa Fé R. R.
4-8½ g. 1,846 m. 203 lo. 8,108 cars.
C. C. Wheeler, Gen. Man. .... Topeka, Kan.
D. J. Chase, Gen. Supt. .... Topeka, Kan.
W. S. Mellen, Asst. Gen. Supt. .... Topeka, Kan.
F. M. Smith, Pur. Agt. .... Topeka, Kan.
Geo. Hackney, Supt. Lo. & Car. Dept. .... do.
Clem. Hackney, M. M. .... Topeka, Kan.
Eastern Div.: C. M. Rathbun, Supt. .... Topeka, Kan.
Henry Hull, G. F. Car Dept. .... Topeka, Kan.
John Fagan, M. M. .... Atchison, Kan.
J. M. Smith, M. M. .... Kansas City, Mo.
W. W. Wheeler, M. M. .... Emporia, Kan.
Mid. Div.: H. R. Nickerson, Supt. .... Nickerson, Kan.
W. Y. Johnson, M. M. .... Nickerson, Kan.
J. Q. Adams, M. M. .... Dodge, Kan.
Col. Div.: W. W. Borst, Supt. .... La Junta, Col.
A. C. Stiles, M. M. .... La Junta, Col.
H. W. Somers, M. M. .... Raton, N. M.
Las Vegas D.: T. J. Seeley, Supt. .... Las Vegas, N. M.
L. H. Waugh, M. M. .... Las Vegas, N. M.
Rio G. Div.: F. Leach, Jr., Supt. .... San Marcial, N. M.
M. C. Wheeler, M. M. .... Wallace, N. M.
T. Clyde, M. M. .... San Marcial, N. M.
H. P. Olcott, M. M. .... Deming, N. M.
Atlanta & West Point R. R. (See Western of Ala.)
Atlantic & Pacific R. R. 4-8½ g. 286 m.
F. W. Smith, Gen. Supt. .... Albuquerque, N. M.
B. W. Angell, Div. Supt. .... Albuquerque, N. M.
Geo. Chalender, Supt. M. P. & M. .... do.
D. B. Sibley, Pur. Agt. .... Chicago, Ill.
Augusta & Knoxville R. R. 30 miles.
A. J. Twiggs, Gen. Supt. & M. M. .... Augusta Ga.

B

Baltimore & Ohio R. R.
4-8½ g. 1,539 m. 546 lo. 14,862 cars.
N. S. Hill, Pur. Agt. .... Baltimore, Md.
E. Ohio Riv. Div. 4-8½ g. 972 m.
W. M. Clements, Mast. Trans. .... Baltimore, Md.
N. E. Chapman, Mast. of Mach. .... Baltimore, Md.
A. J. Cromwell, Asst. M. of M. .... Baltimore, Md.
L. Packard, M. C. B. .... Baltimore, Md.
I. N. Kalbaugh, M. M. .... Baltimore, Md.
Wm. Edwards, M. M. .... Martinsburgh, W. Va.
Sam. Houston, M. M. .... Piedmont, W. Va.
Robert Maxwell, M. M. .... Cumberland, Md.
S. B. Crawford, M. M. .... Grafton, W. Va.
Alex. Laird, M. M. .... Parkersburg, W. Va.
Chas. Hirsch, M. M. .... Wheeling, W. Va.
Pitts. Div.: T. M. King, Gen. Supt. .... Pittsburg, Pa.
J. E. Sampsell, M. of Mach. .... Connelsville, Pa.
Trans-Ohio Divs.: B. Dunham, G. Man. .... Newark, O.
W. H. Harrison, Mast. of Mach. .... Newark, O.
E. L. Weisgerber, M. M. .... Newark, O.
H. M. Ingler, M. M. .... Bellaire, O.
O. B. Perkins, M. M. .... Zanesville, O.
Andrew Beckert, M. M. .... Sandusky, O.
F. J. Gunther, M. M. .... Chicago Junction, O.
Chi. Div.: John Thomas, Supt. .... Chicago, Ill.
Benj. Lowther, M. M. .... Garrett, Ind.
W. H. Wilkinson, M. M. .... Kingston, Ill.
Baltimore & Potomac R. R. (See Penna. R. R.)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, Supt. .... Bangor, Me.
C. S. Nason, M. M. .... Bangor, Me.
J. W. Comins, M. C. B. .... Oldtown, Me.
Barclay R. R. 4-8½ g. 16 miles.
F. F. Lyon, Supt. .... Barclay, Pa.
J. A. Hardenburg, Pur. Agt. .... 21 Cort. st., N. Y.
Wm. Johnson, M. M. .... Towanda, Pa.
Bedford, Springville, Owensburg & Bloomfield Ry.
3 g. 41 m. 5 lo. 65 cars.
Jas. W. Kennedy, Gen. Supt. & Pur. Agt.; and
Capt. Geo. Elliott, M. M. .... Bedford, Ind.
Richard G. Elliott, M. C. B. .... Bedford, Ind.
Bellaire & South-Western Ry. Co. 3 g. 42 m. 3 lo. 29 c.
S. J. Cochren, Gen. Man. .... Bellaire, O.
Bell's Gap R. R. 3 g. 23 m. 2 lo. 35 cars.
R. G. Ford, Supt. .... Bellwood (P. O.), Pa.
A. Zimmerman, M. C. B. .... Bellwood, Pa.
Bennington & Rutland Ry. 4-8½ g. 9 m. 10 lo. 214 c.
F. C. White, Supt. & Pur. Agt. .... Bennington, Vt.
G. W. Blanchard, M. M. .... Rutland, Vt.
Bingham, Canyon & Camp Floyd, and
Wasatch & Jordan Valley R. R.'s.
3 g. 44 m. 7 lo. 300 cars.
J. G. Kennedy, Gen. Man. .... Salt Lake City, Utah
Geo. M. Young, Supt. .... do. do.
Bodie Lumber Co. 3 g. 34 miles.
Thomas Holt, Supt. & Pur. Agt. .... Bodie, Cal.
E. M. Luckett, M. M. & C. B. .... Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 36 m. 7 lo. 107 c.
H. M. Witter, Supt. & Pur. Agt. .... Worcester, Mass.
Chas. F. Brigham, M. M. .... Worcester, Mass.
Boston, Concord, Montreal & White Mts. R. R.
4-8½ g. 167 m. 34 lo. 677 cars.
James A. Dodge, Gen. Man. .... Plymouth, N. H.
J. Thos. Vose, Pur. Agt. .... Boston, Mass.
R. Adams, M. M. .... Lake Village, N. H.
G. A. Ferguson, Asst. M. M. .... Lake Village, N. H.
L. D. Pickering, M. C. B. .... Lake Village, N. H.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 53 m. 17 lo. 1,112 cars.
W. V. Reynolds, Gen. Man. .... Mech'ville, N. Y.
J. L. Wellington, Gen. Supt. .... Mechanicville, N. Y.
J. L. Wellington, P. A. .... Mechanicville, N. Y.
W. H. Powell, Jr., M. M. .... Mechanicville, N. Y.
John S. Ellis, M. C. B. .... Mechanicville, N. Y.
Boston, Lowell & Concord R. Rs.
4-8½ g. 300 m. 110 lo. 2,211 cars.
H. C. Sherburne, Gen. Man. .... Boston, Mass.
F. H. Nourse, Pur. Agt. .... Boston, Mass.
Jas. T. Gordon, M. M. .... Concord, N. H.
J. N. Lauder, Supt. Roll. Stock .... Concord N. H.
Boston & Lowell Div.:
J. F. Crockett, M. Trans. .... Boston
Concord Divs.:
H. E. Chamberlain, Supt. .... Concord, N. H.
J. T. Gordon, M. M. & C. B. .... Concord, N. H.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 5 lo. 46 c.
E. H. Whorf, Supt. & Pur. Agt. .... Boston, Mass.
J. L. Folsom, M. M. .... Boston, Mass.
John Coghlan, M. C. B. .... Boston, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 248 lo. 6,012 c.
C. O. Russell, Gen. Supt. .... Springfield, Mass.
W. H. Barnes, Asst. Supt. .... Boston, Mass.
A. B. Underhill, Su. t. M. P. .... Springfield, Mass.
F. D. Adams, M. C. B. .... Allston, Mass.
W. H. Russell, Div. Supt. .... Albany, N. Y.
Horace Eddy, For. M. Sh. .... Springfield, Mass.
J. B. Weston, For. C. Sh. .... Springfield, Mass.
G. H. Colby, For. M. Sh. .... Boston, Mass.
T. B. Purvis, For. M. Sh. .... Greenbush, N. Y.
J. E. Doran, For. C. Sh. .... Greenbush, N. Y.
Boston & Maine R. R. 4-8½ g. 206 m. 84 lo. 2,100 c.
J. T. Furber, Gen. Supt. & P. A. .... Boston, Mass.
Wm. Smith, M. M. .... Boston, Mass.
D. C. Richardson, M. C. B. .... Lawrence, Mass.
Boston & N. Y. Air Line. 4-8½ g. 53 m. 9 lo. 156 c.
Jos. H. Franklin, Supt. .... New Haven, Conn.
Boston & Providence R. R. 4-8½ g. 67 m. 47 lo. 866 c.
A. A. Folsom, Gen. Supt. .... Boston, Mass.
Geo. Richards, M. M. .... Roxbury, Mass.
Jno. Lightner, M. C. B. .... Roxbury, Mass.
Bradford, Bordell & Kinzua R. R. 3 g. 30 m. 6 lo. 80 c.
B. C. Williams, Supt. & Pur. Agt. .... Bradford, Pa.
John Delaney, M. M. & C. B. .... Bradford, Pa.
Bradford, Eldred & Cuba R. R.
C. D. Williams, Supt. & P. A. .... Wellesville, N. Y.
Breakwater & Frankford R. R. (See Junc. & Break.)
Brighthope Ry. 3 g. 37 m. 3 lo. 193 cars.
Jas. R. Worth, Supt. .... Richmond, Va.
A. Gary, Supt. Way & Works .... Winterpock, Va.
Alex. Calder, M. M. .... Chester, Va.
Brunswick & Albany R. R. 5 g. 172 m. 13 lo. 170 c.
R. D. Meader, Supt. .... Brunswick, Ga.
Buffalo, N. Y. & Phila. Ry. 4-8½ g. 121 m. 34 lo. 2,436 c.
Geo. S. Gatchell, Gen. Supt. .... Buffalo, N. Y.
J. H. Poole, Pur. Agt. .... Buffalo, N. Y.
Allen Vail, Supt. M. P. & M. .... Buffalo, N. Y.
Henry Wagner, M. M. .... Buffalo, N. Y.
Buff. Div.: J. T. Gardiner, Supt. .... Buffalo, N. Y.
N. G. Div.: J. W. Watson, Supt. .... Olean, N. Y.
Buff., Pittsburg & W'n R. R. 4-9 g. 165 m. 33 l. 506 c.
Oliver Watson, Jr., Gen. Supt. .... Buffalo, N. Y.
E. H. Witter, Pur. Agt. .... Oil City, Pa.
H. J. Bookhammer, M. M. .... Oil City, Pa.
John Monks, M. C. B. .... Oil City, Pa.
Burlington, Cedar Rapids & Northern Ry.
4-8½ g. 644 m. 62 lo. 2,120 cars.
C. J. Ives, Gen. Supt. .... Cedar Rapids, Ia.
Robt. Williams, Supt. .... Cedar Rapids, Ia.
T. Stickney, Pur. Agt. .... Cedar Rapids, Ia.
R. W. Bushnell, M. M. & C. B. .... Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 36 m. 3 lo. 61 c.
G. L. Linsley, Gen. Man. & Supt. .... Burlington, Vt.
F. G. Brownell, M. M. & P. A. .... Burlington, Vt.
Burlington & Mo. Riv. R. R. (in Neb.) (See C., B. & Q.)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 85 c.
John T. Gerry, Supt. .... Burlington, Ia.
Burlington & Ohio River R. R.
G. P. Merrill, Gen. Man. & Pur. Agt. .... Chicago, Ill.
J. K. Lape, Supt. of Equip. .... Chicago, Ill.

C

Camden & Atlantic R. R. 4-8½ g. 79 m. 16 lo. 264 c.
F. A. Lister, Supt & Pur. Agt. .... Camden, N. J.
Rufus Hill, M. M. .... Camden, N. J.
Samuel Wills, M. C. B. .... Camden, N. J.
Canada Southern Ry. 4-8½ g. 403 m. 89 l. 3,367 c.
W. P. Taylor, Gen. Man. .... Buffalo, N. Y.
A. F. Howland, Pur. Agt. .... St. Thomas, Ont.
W. A. Short, Gen. M. M. .... St. Thomas, Ont.
Rob't Potts, Gen. M. C. B. .... St. Thomas, Ont.
Can. Div.: W. E. Carroll, Supt. .... St. Thomas, Ont.
Robert Potts, M. C. B. .... St. Thomas, Ont.
U. S. Div.: E. P. Murray, Supt. .... Toledo, O.
O. P. Dunbar, M. M. .... Grosse Isle, Mich.
Canadian Pacific R. R. 4-8½ g. 551 m. 26 lo. 473 c.
W. C. Van Horne, Gen. Man. .... Winnipeg, Man.
Eastern Div. 240 m. 16 lo. 276 cars.
Archer Baker, Gen. Supt. .... Montreal, Can.
Tho. Irwin, Mech. Supt. .... Brockville, Ont.
Western Div. 311 m. 10 lo. 207 cars.
A. B. Stickney, Gen. Supt. .... Winnipeg, Man.
Geo. P. Nelson, Pur. Agt. .... Winnipeg, Man.
F. C. Butterfield, M. M. & M. C. B. .... Winnipeg, Man.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 47 m. 3 lo. 31 c.
L. C. Jones, Gen. Supt. .... Fayetteville, N. C.
Isaac W. Clark, M. M. & C. B. .... Fayetteville, N. C.
Caroline Central R. R. (See Ral. & Aug.)
Carson & Colorado R. R. (See Va. & Truckee.)
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 577 c.
C. W. Chapman, Supt. & P. A. .... Catasauqua, Pa.
Thos. E. Evans, M. M. .... Catasauqua, Pa.
Chas. J. Holbach, M. C. B. .... Catasauqua, Pa.
Central and South-Western Railroads (Ga.).
5 g. 975 m. 127 lo. 1,858 cars.
W. G. Raoul, V. P. and G. Man. .... Savannah, Ga.
Wm. Rogers, Gen. Supt. .... Savannah, Ga.
Henry Yonge, Pur. Agt. .... Savannah, Ga.
Cen. Div.: D. D. Arden, M. M. .... Savannah, Ga.
John McCann, M. M. .... Augusta, Ga.
R. M. Barthlemess, M. C. B. .... Savannah, Ga.
So.-West'n Div.: W. F. Shellman, Supt. .... Macon, Ga.
D. M. Gugel, M. M. .... Macon, Ga.
James A. Knight, M. C. B. .... Macon, Ga.
Central R. R. of N. J. 4-8½ g. 544 m. 294 lo. 27,198 c.
Gen. Man. .... New York, N. Y.
B. W. Burnett, Pur. Agt. .... New York, N. Y.
W. W. Stearns, Gen. Supt. .... Elizabeth, N. J.
Cen Div.: Wm. Woodcock, M. M. .... Elizabeth, N. J.
Geo. Hackett, M. C. B. .... Elizabeth, N. J.
C. G. Williams, M. M. .... Jersey City, N. J.
John Alpaugh, M. M. .... Phillipsburg, N. J.
Long Br. Div.: J. F. Randolph, Supt. .... Elizabeth, N. J.
N. J. So. Div.: R. Blodgett, Supt. .... Manchester, N. J.
Wm. Montgomery, M. M. .... Manchester, N. J.
Chas. N. Sawyer, M. C. B. .... Manchester, N. J.
Lehigh & Susquehanna Div.:
W. S. Polhemus, A. G. Supt. .... Mauch Chunk, Pa.
L. C. Brastow, M. M. & C. B. .... Ashley, Pa.
Central R. R. of S. C. (See Wil. & Wel.)
Central Iowa Ry. 4-8½ g. 244 m. 37 lo. 1,487 cars.
D. N. Pickering, Gen. Supt. .... Marshalltown, Ia.
John Player, M. M. .... Marshalltown, Ia.
T. L. Seevers, M. C. B. .... Marshalltown, Ia.
Central Pac. R. R. 4-8½ g. 2,777 m. 296 lo. 7,277 c.
A. N. Towne, Gen. Man. .... San Francisco, Cal.
J. A. Fillmore, Gen. Supt. .... San Francisco, Cal.
R. H. Pratt, A. G. Supt. .... San Francisco, Cal.
J. R. Watson, Gen. Pur. Agt. .... Sacramento, Cal.
A. J. Stevens, Gen. M. M. .... Sacramento, Cal.
Benj. Welch, Gen. M. C. B. .... Sacramento, Cal.
G. J. Turner, M. C. B. .... Sacramento, Cal.
West'n; Visalia Tulare Divs. and North'n R. R.:
A. D. Wilder, Supt. .... W. Oakland, Cal.
G. D. Welch, M. M. (W. Div.) .... W. Oakland, Cal.
W. D. Ludlow, M. C. B. (W. Div.) .... do.
S. J. Johnson, M. M. (T. Div.) .... Tulare, Cal.
D. Rutherford, M. M. (N. Rd.) .... S. Vallejo, Cal.
Sacramento; Oregon Divs.; and Cal. Pac. R. R.
J. B. Wright, Supt. .... Sacramento, Cal.
M. W. Cooley, M. M. .... Sacramento, Cal.
Phil. Douglas, For. Car Sh. .... Sacramento, Cal.
Truckee Div.: Frank Free, Supt. .... Wadsworth, Nev.
Geo. Gregg, M. M. .... Wadsworth, Nev.
Wm. McPherson, F. Car Sh. .... Wadsworth, Nev.
Humb't Div.: G. W. Coddington, Supt. .... Carlin, Nev.
W. F. Smith, M. M. .... Carlin, Nev.
J. C. Doughty, For. Car Sh. .... Carlin, Nev.
Salt Lake Div.: A. G. Fell, Supt. .... Ogden, Utah.
James Lamb, M. M. .... Terrace, Utah.
A. Sherburne, For. Car Sh. .... Ogden, Utah.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, Asst. Supt. .... Los Angeles, Cal.
James Velsir, M. M. .... Los Angeles, Cal.
J. S. Young, For. Car Sh. .... Los Angeles, Cal.
Arizona Div. (So. Pac.):
A. A. Bean, Asst. Supt. .... Tucson, Ariz.
Rio Grande and El Paso Divs. (So. Pac.):
J. Campbell, Ass't Supt. .... El Paso, Texas.
H. C. Standish, For. Sh. .... El Paso, Texas.
Central Vermont R. R. 4-8½ g. 548 m. 132 lo. 2,522 c.
J. W. Hobart, Gen. Supt. .... St. Albans, Vt.
J. M. Foss, A. G. S. & S. of M. P. & M. .... St. Albans, Vt.
No. Div.: J. B. Futvoye, Supt. .... St. Johns, P. Q.
Rut. Div.: J. Burdett, Supt. .... Rutland, Vt.
N. L. Davis, M. M. & C. B. .... Rutland, Vt.
New London & No'n R. R. 143 m. 22 lo. 303 c.
G. W. Bentley, G. Supt. & P. A. .... New London, Ct.
I. W. Dow, M. M. .... New London, Ct.
S. O. Banks, M. C. B. .... New London, Ct.
Charleston & Savannah Ry. 5 g. 115 m. 17 lo. 98 c.)
C. S. Gadsden, Gen. Supt. .... Charleston, S. C.
H. A. Ulmo, M. M. .... Savannah, Ga.
J. D. Murphy, M. C. B. .... Savannah, Ga.
Charlotte, Columbia & Augusta R. R. (See Rich. & D.)
Chateaugay R. R. 3 g. 34 m. 6 lo. 125 cars.
A. L. Inman, Gen. Man. .... Plattsburg, N. Y.
J. M. Davis, Supt. & M. M. .... Plattsburg, N. Y.
Chattaroi Ry. 4-8½ g. 43 miles 11 loco. 483 cars.
C. H. Rockwell, Gen. Man. & P. A. .... Ashland, Ky.
W. C. Pendleton, M. M. .... Ashland, Ky.
Joseph Burley, M. C. B. .... Ashland, Ky.
Cheraw & Chester R. R. 3 g. 30 m. 3 lo. 38 cars.
W. H. Harding, Pres. & Supt. .... Chester, S. C.
A. M. Manning, M. M. .... Chester, S. C.
Cheraw & Darlington R. R. (See Wil. & Wel.)
Cheraw & Salisbury R. R. (See Wil. & Wel.)
Cherokee R. R. 3 g. 37 m. 5 lo. 50 cars.
John Postel, Manager .... Atlanta, Ga.
C. E. Scruten, M. M. & C. B. .... Cedartown Ga.
Chesapeake, Ohio & So.-W'n. 5 g. 365 m. 8 lo. 102 c.
R. Meek, G. S. & Pur. Agt. .... Elizabethtown, Ky.
W. D. Robb, M. M. .... do.
C. A. Simon, M. M. & C. B. .... Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 133 l. 3,543 c.
C. W. Smith, Gen. Man. .... Richmond, Va.
A. H. Wood, Asst. to Gen. Man. .... do.
A. S. Emmons, Pur. Agt. .... Richmond, Va.
John McFarland, Supt. M. P. .... Richmond, Va.
Eastern Div.: E. T. Smith, Supt. .... Richmond, Va.
J. N. King, M. C. B. .... Richmond, Va.
Hunt. Div.: W. P. Harris, Supt.; and
T. L. Chapman, Asst. Supt. M. P., and
H. C. Bassinger, M. C. B. .... Huntington, W. Va.
Lex. Div.: J. D. Yarrington, Supt. .... Lexington, Ky.
Chesnire R. R. 4-8½ g. 80 m. 30 lo. 499 cars.
R. Stewart, Gen. Man. .... Keene, N. H.
H. H. Stone, Pur. Agt. .... Keene, N. H.
F. A. Perry, M. M. .... Keene, N. H.
A. E. Howard, G. For. Car Sh. .... Keene, N. H.
Chester & Lenoir Ry. 3 g. 50 m. 3 lo. 23 cars.
James Mason, Supt. .... Yorkville, S. C.
T. P. Beard, M. M. .... Yorkville, S. C.
Chicago, B. & Kan. City Ry. 4-8½ g. 181 m. 9 lo. 130 c.
J. W. Smith, Gen. Supt. .... Keokuk, Ia.
W. H. Bartlett, Act. M. M. .... Burlington, Ia.
A. B. Allen, M. C. B. .... Farmington, Ia.
Chicago, Burlington & Quincy R. R.
4-8½ g. 2,924 m. 441 lo. 16,499 cars.
T. J. Potter, Gen. Man. .... Chicago, Ill.
H. B. Stone, Supt. Lo. & Car Dept. .... Chicago, Ill.
G. W. Rhodes, S. M. P. & M. .... Aurora, Ill.
Wm. Forsyth, Mech. Eng. .... Aurora, Ill.
(1) C., B. & Q., East of Mo. Riv. 1,938 miles.
H. B. Stone, Gen. Supt. .... Chicago, Ill.
Geo. B. Harris, Pur. Agt. .... Chicago, Ill.
Ill. Divs.: J. D. Besler, Supt. .... Galesburg, Ill.
Chi. Div.: Geo. Alexander, Supt. .... Aurora, Ill.
L. E. Johnson, M. M. .... Aurora, Ill.
Galesburg Div.: F. C. Rice, Supt. .... Galesburg, Ill.
Robert Colville, M. M. .... Galesburg, Ill.
St. L. Div.: S. E. Crance, Supt. .... St. Louis, Mo.
A. Forsyth, M. M. .... Beardstown, Ill.
Ia. & Mo. Divs.: K. H. Wade, Supt. .... Burlington, Ia.
East. Div.: C. M. Levy, Supt. .... Burlington, Ia.
Joel West, M. M. .... Burlington, Ia.
Mid. Div.: D. T. Bacon, Supt. .... Ottumwa, Ia.
West'n Div.: W. T. Ryder, Supt. .... Creston, Ia.
C. W. Eckerson, M. M. .... Creston, Ia.
(2) C., B. & Q., West of Mo. Riv. 935 miles.
G. W. Holdredge, Gen. Supt. .... Omaha, Neb.
Geo. Hargreaves, Pur. Agt. .... Omaha, Neb.
D. Hawksworth, Gen. M. M. .... Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
J. B. Phillippi, Supt. .... Lincoln, Neb.
O. R. Newton, M. M. .... Lincoln, Neb.
R. V. Div.: A. Campbell, Supt. .... Hastings, Neb.
A. & N. Div.: J. McConniff, Supt. .... Lincoln, Neb.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 3,951 m. 425 lo. 13,659 cars.
S. S. Merrill, Gen. Man. .... Milwaukee, Wis.
J. T. Clarke, Gen. Supt. .... Milwaukee, Wis.
J. T. Crocker, Pur. Agt. .... Milwaukee, Wis.
J. M. Lowry, Gen. M. M. .... Milwaukee, Wis.
H. Watkeys, M. M. .... W. Milwaukee, Wis.
John Bailie, Supt. Car Dept. .... Milwaukee, Wis.
La Crosse; Pr. du Chien; Wis. Val.: Chi.: and
Chi. & Pac. Divs.:
Supt. .... Milwaukee, Wis.
Northern Div.: L. B. Rock, Supt. .... Milwaukee, Wis.
Wm. E. Kittredge, M. C. B. .... Milwaukee, Wis.
So.-Wn. Divs.: D. A. Olin, Supt. .... Racine, Wis.
John Taylor, M. M. .... Racine, Wis.
E. A. Eddy, M. C. B. .... Racine, Wis.
Lines West of Mississippi River:
C. H. Prior, A. Gen. Supt. .... Minneapolis, Minn.
H. & D. Div.: C. W. Case, Supt. .... Minneapolis, Minn.
J. O. Pattie, M. M. .... Minneapolis, Minn.
Ia. & Minn. Div.: H. R. Williams, Supt. .... do.
So. M. Div.: F. D. Underwood, Supt. .... La Crosse, Wis.
Ia. & Da. Div.: G. W. Sanborn, Supt. .... Mason City, Ia.
S. Cy. & Da. Div.: J. Jackson, Supt. .... Sioux City, Ia.
F. H. Moulton, M. M. .... Yankton, Dak.
M. Pt. Div.: G. W. Cobb, Supt. .... Mineral Pt., Wis.
Dubuque Div.: J. H. Jenkins, Supt. .... Dubuque, Ia.
S. Charnley, M. M. .... Dubuque, Ia.
Chicago, Pekin & So.-Wn. R. R. 4-8½ g. 88 m. 8 lo. 455 c.
A. H. Crocker, Rec. .... Joliet, Ill.
A. H. Cook, Pur. Agt. .... Chicago, Ill.
A. R. Overton, M. M. .... Joliet, Ill.
F. Shields, M. C. B. .... Streator, Ill.
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 290 lo. 17,799 cars.
R. R. Cable, V. P. & Gen. Man. .... Chicago, Ill.
A. Kimball, Gen. Supt. .... Davenport, Ia.
F. A. Marsh, Pur. Agt. .... Chicago, Ill.
T. B. Twombly, Gen. M. M. .... Chicago, Ill.
B. K. Verbryck, Gen. M. C. B. .... Chicago, Ill.
Ill. Div.: R. H. Chamberlin, Supt. .... Chicago, Ill.
R. Biester, M. M. .... Chicago, Ill.
Sam'l Pullman, M. C. B. .... Chicago, Ill.
Ia. Div.: H. F. Royce, Supt. .... Des Moines, Ia.
J. G. Crockett, M. M. .... Stuart, Ia.
Jas. E. Morrill, M. M. .... Davenport, Ia.
Chas. M. Leonard, M. C. B. .... Davenport, Ia.
So.-Wn. Div.: G. F. Walker, Supt. .... Trenton, Ia.
R. A. Carscadin, M. M. .... Trenton, Ia.
Chas. R. Best, M. C. B. .... Trenton, Ia.
K. & Des. M. Div.: Jno. Given, Supt. .... Keokuk, Ia.
S. W. Wakefield, M. M. .... Keokuk, Ia.
Henry Kummer, M. C. B. .... Keokuk, Ia.
Chi., Saginaw & Can. R. R. 4-8½ g. 38 m. 4 lo. 16 c.
J. A. Elwell, Gen. Man. & Pur. Agt. .... St. Louis, Mich.
Jas. T. Hall, Supt. .... St. Louis, Mich.
Chicago, St. Louis & New Orleans R. R.
4-8½ g. 571 m. 101 lo. 1,913 cars.
J. C. Clarke, V. P. & G. Man. .... New Orleans, La.
L. T. Brien, Asst. Gen. Man. .... New Orleans, La.
C. M. Sheafe, Gen. Supt. .... New Orleans, La.
H. B. Febiger, Pur. Agt. .... New Orleans, La.
W. H. Purdy, Supt. Mach. .... McComb City, Miss.
Geo. W. Baxter, M. C. B. .... McComb City, Miss.
So. Div.: E. D. Anderson, Acting Supt. .... do.
W. P. McKinley, M. M. .... McComb City, Miss.
No. Div.: J. G. Mann, Supt. .... Jackson, Tenn.
J. M. Keith, M. M. .... Jackson, Tenn.
J. F. White, M. M. .... Water Valley, Miss.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,037 m. 131 lo. 4,688 cars.
C. F. Hatch, Gen. Supt. .... St. Paul, Minn.
W. H. S. Wright, Pur. Agt. .... St. Paul, Minn.
Matt. Ellis, M. M. .... St. Paul, Minn.
W. B. Rice, M. C. B. .... St. Paul, Minn.
Ea. & No. Div.: T. P. Gere, Supt. .... St. Paul, Minn.
St. Paul Div.: J. F. Lincoln, Supt. .... St. Paul, Minn.
Sioux City Div.: H. Spencer, Supt. .... Sioux City, Ia.
F. W. Heintselman, Gen. For. Sh. .... Sioux Cy, Ia.
Neb. Div.: G. V. Morford, Supt. .... Omaha, Neb.
Chicago, Texas & Mexican Central Ry.
4-8½ g. 52 m. 4 lo. 60 cars.
J. T. Odell, Gen. Supt. .... Dallas, Tex.
Chas. Howard, Pur. Agt. .... Chicago, Ill.
Chicago & Alton R. R. 4-8½ g. 840 m. 213 lo. 6,148 c.
J. C. McMullin, Gen. Man. .... Chicago, Ill.
W. F. Merrill, Gen. Supt. .... do.
A. V. Hartwell, Pur. Agt. .... Chicago, Ill.
Wm. Wilson, Supt. of Mach. .... Bloomington, Ill.
Jos. Townsend, G. For. Car Dept. .... do.
Chi. Div.: A. M. Richards, Supt. .... Bloomington, Ill.
St. Louis Div.: T. M. Bates, Supt. .... Roodhouse, Ill.
Kan. Cy. Div.: O. Vaughan, Supt. .... Slater, Mo.
Wm. McPhail, M. M. .... Slater, Mo.
Chi. & East'n Ill. 4-8½ g. 248 m. 56 lo. 3,000 cars.
O. S. Lyford, Gen. Supt. .... Chicago, Ill.
D. R. Patterson, Pur. Agt. .... Chicago, Ill.
P. W. Drew, M. Trans. .... Chicago, Ill.
Allen Cook, M. M. .... Danville, Ill.
Jas. T. Kerney, M. C. B. .... Danville, Ill.
Chicago & Grand Trunk Ry. (See Grand Trunk.)
Chicago & Iowa R. R. 4-8½ g. 104 m. 15 lo. 237 cars.
W. H. Holcomb, Rec. .... Rochelle, Ill.
H. S. Bryan, M. M. .... Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,281 m. 476 lo. 16,673 cars.
Marvin Hughitt, 2d V. Prs. & G. M. .... Chicago, Ill.
J. D. Layng, Gen. Supt. .... Chicago, Ill.
W. G. Brownson, Asst. Supt. .... Boone, Ia.
R. W. Hamer, Pur. Agt. .... Chicago, Ill.
Geo. W. Tilton, Supt. M. P. & M.; and
J. M. Boon, A. Supt. M. P. & M. .... Chicago, Ill.
Wis. and Mil. Divs. & Sheboygan & W'n Ry.:
Chas. D. Gorham, Supt. .... Chicago, Ill.
Gal. Div.: Chas. Murray, Supt. .... Chicago, Ill.
Pen'r Div.: W. B. Linsley, Supt. .... Escanaba, Mich.
Geo. H. White, M. M. .... Escanaba, Mich.
Mad. Div.: C. A. Swineford, Supt. .... Baraboo, Wis.
Win. & St. P. Div.: S. Sanborn, Supt. .... Winona, Minn.
W. A. Scott, M. M. .... Winona, Minn.
Dak. Cen. Ry.: T. J. Nicholl, Supt. .... Huron, Dak.
Mil. & Mad. Ry.: J. B. Trull, Supt. .... Galena, Ill.
Ia. Div.: J. M. Whitman, Supt. .... Clinton, Ia.
J. O. Chapman, M. M. .... Clinton, Ia.
H. L. Preston, M. C. B. .... Clinton, Ia.
No. Ia. Div.: H. G. Burt, Supt. .... Eagle Grove, Ia.
Chicago & West Michigan:
4-8½ g. 366 m. 43 lo. 1,345 cars.
Geo. C. Kimball, V. P. & G. Man. .... Muskegon, Mich.
C. Harris, Gen. Supt. .... "
H. Park, Pur. Agt. .... "
L. E. Hitchcock .... "
C. & W. M. Rd.: C. M. Lawler, Supt. .... St. Joseph, Mich.
Russell Booth, M. M. .... Muskegon, Mich.
Gr. Hav. Rd.: F. H. May, Manager .... Allegan, Mich.
Russell Booth, M. M. .... Muskegon, Mich.
Gr. Rap. Rd.: A. M. Nichols, Supt. .... Gr. Rapids, Mich.
C. J. Howard, M. M. .... Grand Rapids, Mich.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 1 lo. 27 cars.
J. E. Gimperling, Gen. Man. .... Dayton, O.
Geo. F. Robinson, Supt. .... Washington, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 2 lo. 39 c.
A. T. Roever, Gen. Man. .... Cincinnati, O.
J. C. Homer, M. M. .... Cincinnati, O.
Cincinnati, Green Riv. & Nashville R. R. 3 g.
A. C. Sim, Supt. .... King's Mountain, Ky.
G. Brashears, Pur. Agt. .... Cincinnati, O.
Cincinnati, Hamilton & Dayton R. R. (See C., C., C. & I.)
Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 345 m. 60 lo. 1,930 cars.
J. W. Sherwood, Supt. .... Indianapolis, Ind.
Geo. Tozzer, Pur. Agt. .... Cincinnati, O.
J. S. Patterson, M. of Mach. & M. C. B. .... Cincinn., O.
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 841 m. 96 lo. 2,687 cars.
John Scott, V. Pres. & Gen. Man. .... Cincinnati, O.
James Meehan, Gen. M. M. .... Ludlow, Ky.
Cin. So. Div.: Cecil Fleming, Gen. Supt. .... Cin., O.
Julius Uihlein, Pur. Agt. .... Cincinnati, O.
Frank Allingham, M. M. .... Cincinnati, O.
A. Thomson, M. M. .... Chattanooga, Tenn.
Ala. Gr. S'n Div.: C. B. Wallace, Gen. Supt., and
R. W. Healey, Pur. Agt. .... Chattanooga, Tenn.
George Manuell, M. M. .... Chattanooga, Tenn.
Fred Morgan, M. C. B. .... Chattanooga, Tenn.
V. & M. Div.: E. F. Raworth, G. S. .... Vicksburg, Miss.
James B. Browne, M. M. .... Vicksburg, Miss.
V. S. & P. Div.: F. Y. Dabney, Supt. .... Monroe, La.
W. Bell Smith, M. M. & C. B. .... Monroe, La.
Cincinnati Northern Ry. 3 g. 30 m. 4 lo. 60 c.
G. L. Barringer, Gen. Man. .... Cincinnati, O.
C. W. Bradley, Pur. Agt. .... Cincinnati, O.
T. J. Hamer, M. M. & C. B. .... Cincinnati, O.
Cincinnati, Selma & Mobile R. R. 5 g. 45 m. 2 lo. 39 c.
D. McLaren, Supt. .... Selma, Ala.
Simon Hertz, Pur. Agt. .... Selma, Ala.
J. M. Levis, M. M. .... Marion, Ga.
Cincinnati Southern Ry. (See Cin., N. O. & Tex. Pac.)
Cin., Wabash & Mich. Ry. 4-8½ g. 110 m. 8 lo. 139 c.
Norman Beckley, Gen. Man. & P. A. .... Elkhart, Ind.
O. W. Lamport, Supt. .... Wabash, Ind.
S. B. Tinker, M. M. & M. C. B. .... Wabash, Ind.
Cincinnati & Eastern Ry. 3 g. 76 m. 4 lo. 66 cars.
P. W. Naughton, M. M. .... Cincinnati, O.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 2 lo. 21 cars.
A. H. Kunst, Supt. .... Weston, W. Va.
Sam. A. Steel, M. M. .... Weston, W. Va.
F. Dillie, M. C. B. .... Nottingham, O.
Cleve., Akron & Col. R. R. 4-9 g. 144 m. 14 lo. 638 c.
N. Monsarrat, Gen. Supt. .... Akron, O.
M. M. & C. B. .... Akron, O.
Cleve., Col., Cin. & Ind. Ry:
Cin., Ham. & Dayton and Ind. & St. Louis.
4-8½ g. 812 m. 246 lo. 7,082 cars.
J. H. Devereux, Pres. .... Cleveland, O.
E. B. Thomas, Gen. Man. .... Cleveland, O.
J. L. Yale, Pur. Agt. .... Cleveland, O.
W. F. Turreff, Gen. M. M. .... Cleveland, O.
(1) Cl., Col., Cin. & Ind. Divs. 471 m. 162 lo. 4,768 c.
Col. & Cin. Div.: Robt. Blee, Supt. .... Cleveland, O.
W. L. Gilmore, M. M. .... Cleveland, O.
A. G. Steinbrenner, G. For. Car Dept. .... do.
Ind'p'lis Div.: C. C. Gale, Supt. .... Indianapolis, Ind.
J. K. Lape, M. M. .... Brightwood, Ind.
N. Mark, G. For. Car Dept. .... Brightwood, Ind.
Day. & Union: H. S. Gordon, M. M. .... Dayton, O.
(2) Cin., Ham. & Day. Divs. 341 m. 84 lo. 2,314 c.
J. H. Barrett, Gen. Supt. .... Cincinnati, O.
Jas. Eckford, M. M. .... Cincinnati, O.
W. H. H. Allison, G. For. Car Dept. .... do.
C. R. & C. Div.: W. S. Brewer, M. M. .... Richm'd, Ind.
D. & M. Rd.: J. H. Barrett, Supt. .... Toledo, O.
Jno. Black, M. M. .... Lima, Ohio.
Cleveland & Pittsburg R. R. (See Penna. Co.)
Cleveland, Tuscarawas Valley & Wheeling Ry.
4-8½ g. 158 m. 23 lo. 1,522 cars.
Oscar Townsend, Gen. Man. .... Cleveland, O.
Wm. Thornburg, Supt. .... Cleveland, O.
W. A. Stone, M. M. .... Lorain, O.
Cleve. & Marietta R. R. 4-8½ g. 99 m. 9 lo. 157 cars.
S. C. Baldwin, Gen. Man. .... Marietta, O.
R. B. Hoover, Pur. Agt. .... Marietta, O.
E. C. Hill, M. M. .... Marietta, O.
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 207 cars.
Jas. R. Barber, Gen. Supt. .... Cobourg, Ont.
Jas. Clark, M. M. .... Cobourg, Ont.
John Tinney, M. C. B. .... Cobourg, Ont.
Columbia & Greenville R. R. (See Rich. & Dan.)
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 319 m. 76 lo. 6,000 cars.
Orland Smith, Gen. Man. .... Columbus, O.
G. R. Carr, Gen. Supt. & Pur. Agt. .... Columbus, O.
J. G. Hutchins, M. M. .... Columbus, O.
J. M. Rockafield, M. C. B. .... Columbus, O.
Tol. Div.: M. T. Seymour, Supt. .... Columbus, O.
Hock. V. Div.: M. P. L. Booth, Supt. .... Columbus, O.
Ohio Riv. Div.: C. D. Norris, Supt. .... Logan, O.
Columbus & Maysville Ry. (See Cin. & East.)
Columbus & Rome R. R. 3 g. 32 m. 2 lo. 25 cars.
M. E. Gray, Supt. .... Columbus, O.
Columbus & Western Ry. 5 g. 89 m. 2 lo. 19 cars.
E. A. Llewellen, Gen. Man. .... Columbus, Ga.
R. A. Bridges, M. M. .... Opelika, Ala.
Concord & Claremont R. R. (See Northern of N. H.)
Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 33 lo. 456 c.
J. Mulligan, Supt. & Pur. Agt. .... Springfield, Mass.
W. H. Stearns, M. M. .... Springfield, Mass.
Robert Hitchcock, M. C. B. .... Springfield, Mass.
Connotton Valley R. R. 3 g. 109 m. 10 lo. 531 cars.
W. W. Hungerford, Gen. Man. .... Canton, O.
W. N. Moffet, Supt. .... Canton, O.
A. B. Proal, Pur. Agt. .... Canton, O.
E. W. Poorman, M. M. .... Canton, O.
Cornwall R. R. 4-8½ g. 9 m. 5 lo. 166 cars.
Frank Donahue, G. Supt. & M. M. .... Lebanon, Pa.
Levi Blonch, M. C. B. .... Lebanon, Pa.

Credit Valley Ry. 4-8½ g. 184 m. 22 lo. 484 cars.
James Ross, *Gen. Supt* ....Toronto, Ont.
John Macnab, *Pur. Agt* ....Toronto, Can.
H. G. Taylor, *Mech. Supt* ....Toronto, Can.
Crown Point Iron Co. R. R. 3 g. 13 m.
A. L. Inman, *Gen. Man* ....Plattsburg, N. Y.
J. M Davies, *Supt. & M. M.* .Crown Point, N. Y.
J. C. Sherman, *M. C. B* ..... Crown Point, N. Y.
Cumberland & Pennsylvania R. R. 4-8½ g. 55 m.
P. L. Burwell, *Gen Supt & P A.* Cumberland, Md.
N. W. Howson, *Mast. of Mach.* Mt. Savage, Md.
Nathan Binix, *M. C. B* ....Mt. Savage, Md.
Cumberland Valley R. R. 4-9 g. 125 m. 21 lo. 280 cars.
J. F. Boyd, *Supt* ....Chambersburg, Pa.
A. S. Hull, *M. M* ....Chambersburg, Pa.
C. Wickey, *F. C. R* ....Chambersburg, Pa.

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Danbury & Norwalk R. R. 4-8½ g. 33 m. 6 lo. 100 c.
L. W. Sandiforth, *G. Supt. & P. A.* .S. Norwalk, Ct.
N. M. George, *M. M. & C. B* ....Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. W. Goodrich, *Ch. Eng* .....Leakesville, N. C.
Danville, Olney & O. R. R.R. 4-8½ g. 110 m. 4 lo. 83 c.
C. Howard, *G. Man. & Pur. Agt.* .Boston, Mass.
J. M. Graham, *Supt* ....Kansas, Ill.
Louis Parisoe, *M. M & C. B* ....Kansas, Ill.
Dayton & Union R. R. (*See Ohio Ry.*)
Delaware, Lackawanna & Western R. R.
4-8½ g. 670 m. 348 lo. 26,187 cars.
Wm. F. Halstead, *Gen. Supt* .....Scranton, Pa.
G. W. B. Cushing, *Pur. Agt* ..New York, N. Y.
Walter Dawson, *Mast. of Mach* ...Scranton, Pa.
Robt. McKenna, *M. C. B* ....Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M.* .Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt* ....Utica, N. Y.
Thos. Thatcher, *M. M* ....Utica, N. Y.
Morris & Essex Div. and Sussex R. R.:
A. Reasoner, *Supt* ....Hoboken, N. J.
W. H. Lewis, *M. M* ....Kingsland, N. J.
J. W. Baker, *Mast. Car Rep.* .....Dover, N. J.
Oswego & Syracuse Div.:
W. B. Phelps, *Supt* ....Oswego, N. Y.
Jas. Buchanan, *M. M* ....Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, *Gen. Supt* ....Syracuse, N. Y.
Jas. Buchanan, *M. M* ....Syracuse, N. Y.
Delaware Western R. R. 4-8½ g. 20 m. 4 lo. 30 cars.
David Connell, *Supt* ....Wilmington, Del.
Delaware & Chesapeake R. R. 4-8½ g. 54 m. 3 lo. 16 c.
O. S. Sanford, *Supt* ....Oxford, Md.
Joseph A. Baynard, *M. M* ....Oxford, Md.
Chas. E. Mason, *M. C. B* ....Oxford, Md.
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 596 m. 151 lo. 9,248 cars.
C. F. Young, *Gen. Man* ....Honesdale, Pa.
C. F. Young, *Pur. Agt* ....Albany, N. Y.
R. C. Blackall, *Supt. of Mach* .....Albany N. Y.
Susq. Div.: C. D. Hammond, *Supt.* Albany, N. Y.
C. A. Jones, *M. M* ....Oneonta, N. Y.
J. R. Skinner, *M. C. B.* ....Oneonta, N. Y.
Sar. & Ch. Divs.: T. Voorhees, *Supt* ...Troy, N. Y.
J. L. Corey, *M. M* ....Green Island, N. Y.
Chr. Körner, *M. C. B* ....Green Island, Y.
Pa. Div.: R. Manville, *Supt & Pur Agt.* and
S. H. Dotterer, *M. M* ....Carbondale, Pa.
T. Orchard, *M. C. B* ....Carbondale, Pa
Denver & Rio Grande Ry. 3 g. 1,062 m. 170 lo. 4,617 c.
D. C. Dodge, *Gen. Man* ....Denver, Col.
Geo. W. Ristine, *Asst. Gen. Man* ...Denver, Col.
A. B. Garner, *Pur. Agt.* .Colorado Springs, Col.
N. W. Sample, *M. M* ....Denver, Col.
Frank Howard, *M. C. B* ....Burnham, Col.
1st Div.: W. H. Bancroft, *Supt* ....S. Pueblo, Col.
2d Div.: R. M. Ridgway, *Supt* ..... Alamosa, Col.
3d Div.: Cole Lydon, *Supt* ....Leadville, Col.
Gun'n Div.: J. A. Myers, *Supt* ....Salida, Col.
B. & E. Riv. Div.: C. Lydon, *Supt.* .Leadville, Col.
San J. Div.: R. M. Ridgeway, *Supt* ..Antonito, Col.
Des Moines & Ft. Dodge. 4-8½ g. 87 m. 11 lo. 158 c.
C. N. Gilmore, *Supt* ....Des Moines, Ia.
John McGrayel, *M. M* ......Grand Junction, Ia.
E. A. Avery, *M. C. B* ....Grand Junction, Ia.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 36 lo. 478 c.
G. R. Nash, *Gen. Man* ....Detroit, Mich.
John S. Lorimer, *Storekeeper* ....Detroit, Mich.
W. J. Morgan, *Supt* ....Detroit, Mich.
F. Parker, *Mech. Supt* ....Detroit, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c
John B. Mulliken, *Gen. Man* ......Detroit, Mich.
Allan Bourn, *Pur. Agt* ....Detroit, Mich.
Thos. M. Fish, *Gen. Supt* ....Ionia, Mich.
G. C. Watrous, *M. M. & C. B* ......Ionia, Mich.
Det., Mack. & Marq. R. R. 4-8½ g. 151 m. 8 lo. 227 c.
Thos. McKeown, *Gen. Supt* ...Marquette, Mich.
E. W. Allen, *Pur. Agt* ....Marquette, Mich.
John Wilson, *Mech. Supt* ......Marquette, Mich.
Dorchester & Delaware R. R. 4-8½ g. 33 m.
Thos. E. Wright, *Supt* ....Cambridge, Md.
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt* ....Waverly, Ia.
W. S. Couch, *Pur. Agt* ....Dubuque, Ia.
Duck River Valley R. R. 3 g. 34 m.
Geo. Childress, *Supt* ....Columbia, Tenn.
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt* ....Dunkirk, N. Y.
R. C. Moore, *Pur. Agt* ....New York, N. Y.
J. C. Haggett *M. M. & C. B* .....Dunkirk, N. Y.

E

East Broad Top R. R. 3 g. 30 m. 6 lo. 191 cars.
A. W. Sims, *Supt* ....Orbisonia, Pa.
G. A. Haggerty, *M. M* ....Orbisonia, Pa.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,185 m. 133 lo. 1,597 cars.
Henry Fink, *Gen. Man* ....Lynchburg, Va.
J. F. O'Brien, *Gen. Supt* ....Knoxville, Tenn.
Main Stem; Ohio; and No. Car. Divs.:
F. K. Huger, *Supt* ....Knoxville, Tenn.
B. J. Sitton, *M. M* ....Knoxville, Tenn.
Jos. Armbruster, *M. C. B* ....Knoxville, Tenn.
Selma and Alabama Central Divs.:
John M. Bridges, *Supt* ....Selma, Ala.
Simon Gay, *M. M* ....Selma, Ala.
W. W. Pierce, *M. C. B.* ....Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., *Supt* ..... Memphis, Tenn.
H. N. Burford, *M. M* ....Memphis, Tenn.
J. J. Casey, *M. C. B* ....Memphis, Tenn.
Macon & Brunswick Div.:
J. F. Mallory, *Supt* ....Macon, Ga.
G. R. Wagnon, *M. M* ....Macon, Ga.
[E]astern R. R. 4-8½ g. 283 m. 99 lo. 2,268 cars.
D. W. Sanborn, *Mast. of Trans* ..Boston, Mass.
Geo. J. Fisher, *Pur. Agt* ....Boston, Mass.
Amos Pillsbury, *S. M. P. & M.* ..E. Boston, Mass.
J. D. Billings, *M. C. B* ....Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt.*, Wolfboro J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 123 c.
H. W. Bates, *V. P. & Manager* ...Greenup, Ky.
Geo. Gibbs, *Pur. Agt* ....Riverton, Ky.
D. S. Weaver, *M. M* ....Riverton, Ky.
Eastern Shore R. R. 4-8½ g. 38 m. 2 lo.
W. Thompson, *Supt* ....Princess Anne, Md.
F. Strattner, *M. M* ....Princess Anne, Md.
Elberton Air-Line R. R. (*See Rich. & Dan. N. G. Brs.*)
Elizabeth City & Norfolk R. R. 4-8½ g. 79 m. 5 lo. 96 c.
M. K. King, *Gen. Man. & Pur. Agt.* Norfolk, Va.
J. S. Whitworth, *M. M. & C. B* ....Norfolk, Va.
Erie & Pittsburgh R. R. (*See Penna. Co.*)
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 124 cars.
P. Everts, *Gen. Supt & Pur. Agt.* .Eureka, Nev.
J. P. Rugg, *M. M* ....Palisade, Nev.
A. S. Longley, *M. C. B* ....Palisade, Nev.
Europ. & No. Amer. Ry. 4-8½ g. 114 m. 15 lo. 557 c.
F. W. Cram, *Supt. & Pur. Agt* ....Bangor, Me.
A. O. Bailey, *M. M. & C. B* Mattawamkeag, Me.
Evansville, Paducah & Cairo Line. 200 miles.
G. J. Grammer, *Supt* ....Evansville, Ind.
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c.
H. L. Shepard, *Supt* ....Evansville, Ind.
Evansv. & Terre Haute. 4-8½ g. 114 m. 26 lo. 900 c.
C. J. Hepburn, *Gen. Supt* ...... Evansville, Ind.
John Torrence, *Gen. For* ......Evansville, Ind.

F

Fitchburg R. R., 4-8½ g. 189 m. 100 lo. 3,315 cars.
John Adams, *Gen. Supt* ....Boston, Mass.
E. K. Turner, *Asst. Supt* ..... Fitchburg, Mass.
F. S. Pratt, *Pur. Agt* ....Boston, Mass.
W. A. Foster, *Acting Supt. M. P. & M.*; and
J. W. Marden, *M. C. B* ....Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 318 m. 52 lo. 1,550 cars.
H. C. Potter, *Gen. Man* ....E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man.* .E. Saginaw, Mich.
G. G. Cook, *Pur. Agt* ....E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt* ..E. Saginaw, Mich.
W. F. Potter, *Supt.* (E. Div.)..E. Saginaw, Mich.
M. V. Meredith, *Supt.* (W. Div.)E. Saginaw, Mich.
T. J. Hatswell, *M. M* ....E. Saginaw, Mich.
R. McPherson, *M. C. B* ....E. Saginaw, Mich.
Florida Central & Western R. R.
5 g. 234 m. 16 lo. 160 cars.
Wm. M. Davidson, *Gen. Man.* Jacksonville, Fla.
J. P. Laird, *Supt* ....Tallahassee, Fla.
Jas. S. McElroy, *M. M. & C. B.* Jacksonville, Fla.
Florida Southern Ry. 3 g. 50 m. 5 lo. 53 cars.
H. S. Ming, *Gen. Supt* ....Palatka, Fla.
F. A. Garrison, *Pur. Agt* ....Palatka, Fla.
J. W. Roberts, *M. M. & C. B.* .... Palatka, Fla.
Florida Transit R. R. 5 g. 224 m.
D. E. Maxwell, *Gen. Supt* ....Fernandina, Fla.
John Hedges, *Pur. Agt* ....Fernandina, Fla.
J. V. Webster, *M. M* ....Fernandina, Fla.
G. Hernandez, *M. C. B* ....Fernandina, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 18 c.
Lawton Caten, *Supt* ....Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, *Supt. & P. A.* Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. 4-8½ g.
G. R. Pearson, *Supt* ....Fort Dodge, Ia.
Ft. Madison & No.-West'n Ry. 3 g. 41 m. 4 lo. 120 c.
S. B. Kenrick, *Supt. & Pur. Agt.* Ft. Madison, Ia.
L. Lamb, *M. M. & C. B* ....Ft. Madison, Ia.
Ft. Wayne, Cin. & Louisv. 4-8½ g. 108 m. 9 lo. 249 c.
White Water R. R 4-8½ g. 62 m. 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt.* Ft. Wayne, Ind.
W. D. Morris, *M. M. & C. B.* .Ft. Wayne, Ind.
Ft. Wayne & Jackson. 4-8½ g. 100 m. 10 lo. 353 c.
Gen. Supt. & P. A. ....Jackson, Mich.
C. W. Hollister *M. M. & C. B* ... Jackson, Mich.
Fulton County N. G. Ry. 3 g. 47 m. 2 lo. 106 cars.
A. C. Atherton, *Gen. Supt. & P. Agt.* Lewiston, Ill.

G

Galveston, Harrisburg & San Antonio Ry.
4-8½ g. 492 m. 47 lo. 1870 cars.
Jas. Converse, *Gen. Supt* ....Houston, Tex.
Chas. Babbidge, *Pur. Agt* ....Boston, Mass.
D. T. Davis, *Supt. M. P. & M.* .Harrisburg, Tex.
James Alexander, *M. C. B* .. . Harrisburg, Tex.
El Paso Div. (*See Cen. Pac.*) 4-8½ g. 144 miles.
Galveston, Houston & Henderson R. R.
4-8½ g. 50 m. 17 lo. 212 cars.
W. H. Harding, *G. Man. & P. Agt.* Galveston, Tex.
Allen McCoy, *Supt* ....Galveston, Tex.
J. G. Conlon, *M. M* ....Galveston, Tex.
Geneva, Ithaca & Sayre R. R. (*See Lehigh Val.*)
Georgia R. R. 5 g. 307 m. 42 lo. 938 cars.
John W. Green, *Gen. Man* ....Augusta, Ga.
John S. Cook, *M. M* ....Augusta, Ga.
T. M. Preval, *M. C. B* ....Augusta, Ga.
Georgia Pacific Ry. (Miss. Div.). 3 g. 43 m. 2 lo. 44 c.
C. M. Bolton, *Supt* ....Greenville, Miss.
W. M. Sutton, *Pur. Agt* ....Greenville, Miss.
Benj. Davis, *M. M* ....Greenville, Miss.
J. B. Shelton, *M. C. B* ....Greenville, Miss.
Grand Haven R. R. (*See Chic. & W. Mich.*)
Grand Junction R'y. (*See Midland of Can.*)
G'd Rap., Newaygo & L. S. R. R. (*See Chic. & W. M.*)
Grand Rapids & Indiana. 4-8½ g. 456 m. 46 lo. 1,566 c.
W. O. Hughart, *Gen. Man.* Grand Rapids, Mich.
W. R. Shelby, *Pur. Agt* ....Grand Rapids, Mich.
S. D. Bradley, *M. M* ...... Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt.* G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt.* Fort Wayne, Ind.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
T. M. Williamson, *Supt. & P. A.* .Gr. Tower, Ill.
Hugh Smith, *M. M. & C. B* ....Grand Tower, Ill.
Grand Trunk Ry. 4-8½ g. 1,267 m. 434 lo. 9,403 c.
Joseph Hickson, *Gen. Man* ....Montreal, Can.
Wm. Wainright, *Asst. Gen. Man.* Montreal, Can.
Gr. Tr. Divs.: W. J. Spicer, *Supt.* Montreal, Can.
Jno. Taylor, *Gen. Storekeeper.* Montreal, Can.
Herbert Wallis, *Mech. Supt* ...Montreal, Can.
Wm. McWood, *M. C. B* .... Montreal, Can.
F. R. F. Brown, *Asst. M. S* ....Montreal, Can.
J. Davis Barnett, *Asst. M. S.* .Stratford, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 330 m. 56 lo. 1,191 c.
S. R. Callaway, *Gen. Man* .... Chicago, Ill.
W. H. Pettibone, *Supt.* ..Battle Creek, Mich.
N. Wall, *Pur. Agt* ....Fort Gratiot, Mich.
H. Roberts, *Mech. Supt* ....Port Huron, Mich.
Great Western Ry. 4-8½ g. 823 m. 216 lo. 5,039 c.
F. Broughton, *Gen. Man* ....Hamilton, Ont.
Chas. Stiff, *Asst. Gen. Man* ......Hamilton, Ont.
John Burton, *Supt* ....Hamilton, Ont.
E. R. Baines, *Pur. Agt* ....Hamilton, Ont.
C. K. Domville, *Loco. Supt* ......Hamilton, Ont.
C. F. Hanson, *M. M* ....London, Ont.
Henry Childs, *Car Supt* ....London, Ont.
Green Bay, Winona & St Paul R. R.
4-8½ g. 250 m. 19 lo. 599 cars.
Timothy Case, *V. P., Gen. Man.* Green Bay, Wis
James S. Mott, *Pur. Agt* .... Green Bay, Wis.
A. Fenwick, *M. M* .... Ft. Howard, Wis.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 400 m. 32 lo. 1,000 c.
John Sealy, *Gen. Man* ....Galveston, Texas.
F. P. Killeen, *Asst. Gen. Man. & Pur. Agt.* do.
G. B. Nichols, *M. M* ....Galveston, Texas.
W. H. Martin, *M. C. B* ....Galveston, Texas.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 70 c.
M. D. Monserrate, *Pr. & Supt* ....Cuero, Texas.
James Mooney, *M. M* ....Cuero, Texas.

H

Halifax & Cape Breton Ry. 4-8½ g. 79 m. 5 lo. 237 c.
H. Abbott, *Manager* ....New Glasgow, N. S.
Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,860 c.
John B. Carson, *Gen. Man* ....Hannibal, Mo.
W. R. Woodard, *Supt* ....Hannibal, Mo.
T. L. Dunn, *Ch. Eng. & Pur. Agt.* .Hannibal, Mo.
Jas. Long, *Supt. M. P. & Car Dep.* Hannibal, Mo.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 9 lo. 106 cars.
H. D. Scott, *Gen. Supt* ....Hanover, Pa.
John J. Bingley *M. M* ....Hanover, Pa.
Henry Britcher, *M. C. B* ....Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 27 m. 2 lo. 7 c.
R. H. Middleton, *Supt* ......Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 45 m. 7 lo. 196 c.
Samuel Babcock, *Pr. & Supt* ......Hartford, Ct.
S. E. Brewer, *M. M* ....Hartford, Conn.
Hartford & Conn. W'n R. R. 4-8½ g. 69 m. 10 lo. 235 c.
John F. Jones, *Supt* ....Hartford, Ct.
J. C. Barton, *M. M* ....Hartford, Ct.
Housatonic R. R. 4-8½ g. 126 m. 22 lo. 495 cars.
W. H. Yeomans, *Supt* ....Bridgeport, Ct.
D. S. Draper, *Pur. Agt* ....Bridgeport, Ct.
N. Slingland, *M. M* ....Falls Village, Ct.
J. J. Ferris, *M. C. B* ....Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 50 miles.
S. L. Werden, *V. P. & Gen. Man.* Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 109 m. 6 lo. 224 c.
Paul Bremond, *Pr. & Pur. Agt* .Houston, Tex.
E. L. Bremond, *Gen. Man* ....Houston, Tex.
A. Riggs, *M. M* ....Houston, Tex.
Houston & Tex. Cen. Ry. 4-8½ g. 701 m. 78 lo. 2,526 c.
G. Jordan, *V. Pr. & Gen. Man* ....Houston, Tex.
A. H. Swanson, *Gen. Supt* ....Houston, Tex.
E. S. Larchar, *Pur. Agt* ....New York, N. Y.
L. C. Noble, *Gen. M. M* ....Houston, Tex.
James McGee, *M. C. B* ....Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt.* Houston, Tex.
No. & Mi. Divs.: G. A. Quinlan, *Supt.*, and
C. H. Burns, *Asst. M. M* ......Corsicana, Tex.
No.-Wn. Div.: Donald Allen, *Supt* .... Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 85 m. 5 lo. 72 cars.
F. O. Wyatt, *Gen. Man* ....Clarinda, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 62 m. 18 lo. 69 c.
Geo. F. Gage, *Gen. Supt.* .... Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt.* .Philadelphia, Pa.
William Barkla, *M. M* ....Saxton, Pa.

I

Illinois Central R. R. 4-8½ g. 1,554 m. 224 lo. 6,172 c.
E. T. Jeffery, *Gen. Supt* ....Chicago, Ill.
C. A. Beck, *Asst. Gen. Supt* ....Chicago, Ill.
O. Ott, *Pur. Agt* ....Chicago, Ill.
S. J. Hayes, *Supt. of Mach* ....Chicago, Ill.
W. B. Snow, *M. M. Car Works* ....Chicago, Ill.
Chic. Div.: T. J. Hudson, *Supt* .... Cairo, Ill.
Henry Schlacks, *M. M* ....Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt* ....Pontiac, Ill.
Spring. Div.: W. Wilkinson, *Supt.* Springfield, Ill.
W. B. McKenna, *M. M* ....Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt* ....Amboy, Ill.
J. B. Edams, *M. M* ....Amboy, Ill.
So. Div.: David Oxley, *M. M* ..... Centralia, Ill.
Ia. Div.: D. W. Parker, *Supt* .... Dubuque, Ia.
Thos. W. Place, *M. M* .... Waterloo, Ia.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man* ....Decatur, Ill.
E. D. Frost, *Gen. Supt* .... do.
J. G. Clifford, *M. M* ....Terre Haute, Ind.
Illinois & St. Louis R. R. 4-8½ g. 18 m. 5 lo. 402 c.
C. H. Sharman, *Gen. Supt. & P. A.* Belleville, Ill.
E. Hockett, *M. M* ....Belleville, Ill.
Charles Rotha, *M. C. B* .... E. St. Louis Ill.
Indiana, Bloomington & Western Ry.
4-8¾ g. 712 m. 64 lo. 3,650 cars.
C. E. Henderson, *Gen. Man.* Indianapolis, Ind.
H. C. Norton, *Pur. Agt* .... Indianapolis, Ind.
B. Warren, *Gen. M. M* ....Indianapolis, Ind.
Peoria Div.: I. H. Wilson, *Supt.* .Indianapolis, Ind.
E. Hiserodt, *M. M* .... Urbana, Ill.
St. Louis Div.: I. H. Wilson, *Supt* ......Indnpls, Ind.
John King, *M. M* ....Indianapolis, Ind.
Ohio Div.: D. W. C. Brown, *Supt* ....Sandusky, O.
Jos. S. Porter, *M. M* ....Sandusky, O.
Indiana, Illinois & Iowa R. R. 42 miles.
F. M. Drake, *Gen. Man* ....Dwight, Ill.
J. P. Shouts, *Supt* ....Dwight, Ill.
Ind'p'lis & St. Louis R. R. 266 m. 56 lo. 2,276 c.
C. C. Gale, *Gen. Supt* ....Indianapolis, Ind.
J. L. Yale, *Pur. Agt* ....Cleveland, O.
T. W. Ransom, *M. M. & C. B* ......Mattoon, Ill.
Indianapolis & Vincennes R. R. (*See Penna. Co.*)
Intercolonial Ry. 4-8½ g. 846 m. 111 lo. 3,223 cars.
David Pottinger, *Chief Supt* ......Moncton, N. B.
T. V. Cooke, *Gen. Storekeeper* ..Moncton, N. B.
H. A. Whitney, *Mech Supt* ....Moncton, N. B.
Ewd. Shaffer, *M. C. B* .... Moncton, N. B.
Monc. Div.: James E. Price, *Supt.* Moncton, N. B.
Hal. & St. J. Div.: Jas. Coleman, *Supt.* .Truro, N. B.
No'n Div.: M. Busby, *Supt* ....Cambellton, N. B.
Levis Div.: M. McDonald, *Supt.* Rivière du Loup, Q.
International Ry. 4-8½ g. 69 m. 2 lo. 12 cars.
D. E. McFee, *Supt* ....Sherbrooke, Que.
International & Gt. N'n R. R. (*See St. L., I. M. & S.*)
Iron Mountain & Helena R. R. 4-8½ g. 27 m. 2 lo. 11 c.
Wm. Bailey, *Pres. & Gen. Man* ....Helena, Ark.
D. Stillinger, *Supt* ....Helena, Ark.
F. M. Green, *Pur. Agt* ....Helena, Ark.
Wm. Summers, *M. C. B* ....Helena, Ark.
Ithaca, Auburn & Western R. R. 4-8½ g. 38 m.
Fred T. Peet, *Supt* ....Auburn, N. Y.
Ira Dunning, *M. M* ....Auburn, N. Y.

J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 68 c.
E. S. Greenleaf, *Supt* ....Jacksonville, Ill.
Ira Petrie, *M. M* ....Jacksonville, Ill.
Jacksonv., Pensacola & Mob. (*See Fla. Ce-t. & W.*)
Jamesville & Washington. 4-8½ g. 22 m. 3 lo. 24 c.
A. Fisher, *Manager* ....Dymond City, N. C.
J. E. Lordley, *M. M. & C. B.* .Dymond City, N. C.
Jeffersonv'l, Madison & Indpls. R. R. (*See Pa. Co.*)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager* ...Jersey City, N. J.
Junction & Breakwater; Breakwater & Frankford; and Worcester R. Rs. 4-8½ g. 101 m. 6 l. 133 c.
J. & B. Rd.: Thos. Groome, *Supt* .... Lewes, Del.
Geo. Messick, *M. M* ....Lewes, Del.
W. H. Virden, *M. C. B* ....Lewes, Del.
B. & F. and W. Rds.: J. L. Mapes, *St.* Berlin, Md.

K

Kansas Central R. R. (*See Union Pacific.*)
Kansas City, Lawrence & So. Kansas.
C. C. Wheeler, *Gen. Man* .... Topeka, Kan.
J. L. Barnes, *Supt* ....Lawrence, Kan.
F. D. Volk, *M. M* ....Ottawa, Kan.
Kansas City, Fort Scott & Gulf R. R. 4-8½ g.
Geo. H. Nettleton, *Gen. Man.* .Kansas City, Mo.
L. W. Towne, *Gen. Supt* ..... Kansas City, Mo.
H. P. Jacques, *Pur. Agt* .... Kansas City, Mo.
J. L. Barnes, *Supt* ....Kansas City, Mo.
J. S. McCrum, *M. M* ....Kansas City, Mo.
A. N. Montier, *M. C. B* ....Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ g. 368 m. 38 lo. 1,148 cars.
J. F. Barnard, *Gen. Supt. & P. A.* St. Joseph, Mo.
F. A. Chase, *M. M* .... St. Joseph, Mo.
Thos. Aylesbury, *M. C. B* ...... St. Joseph, Mo.
Kendall & Eldred R. R. (*See Olean, B. & W.*)
Kent Co.; Sm. & Del. Bay Rds. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. Man* ....Chestertown, Md.
Kentucky Central R. R. 5 g. 148 m. 19 lo. 371 cars.
J. D. Ellison, *Gen. Man* ....Covington, Ky.
J. H. Setchel, *Supt. of Trans. & Mo. Po.* .. do.
F. Allingham, *M. M* ....Covington, Ky.
J. L. Hackathorn, *M. C. B* ......Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, *Supt. & P. A.* .Mt. Sterling, Ky.
S. P. Hatfield, *M. M* ....Mt. Sterling, Ky.
Kinzua R. R. (*See Olean, B. & W.*)
Kingston & Pembroke Ry. 4-8½ g. 65 m. 4 lo. 76 c.
B. W. Folger, *Supt* ....Kingston, Ont.
Wm. Harty, *Pur. Agt* ....Kingston, Ont.
Geo. Becker, *M. M* ....Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 5 lo. 95 cars.
C. A. Coombs, *Supt* ....Bath, Me.
Wm. A. Field, *M. M* ....Bath, Me.
C. L. Turner, *M. C. B* ....Bath, Me.
Knoxville & Augusta R. R. 4-6 g. 16 m. 2 lo. 34 cars.
J. M. Hood, *Supt* ....Marysville, Tenn.
M. R. Hood, *Pur. Agt* ....Marysville, Tenn.

L

Lake Erie & Western Ry. 4-8½ g. 362 m. 35 l. 1,526 c.
E. H. Waldron, *Gen. Man* ....La Fayette, Ind.
E. H. Andress, *Pur. Agt* ....La Fayette Ind.
H. L. Cooper, *Supt. of Equipment* ....Lima, O.
Sandusky Div.: D. S. Hill, *Supt* ......Fremont, O.
Bloom. Div.: *Supt* ...La Fayette, Ind.
Lake Shore & Michigan. So'n Ry.
4-8½ g. 1,243 m. 537 lo. 16,018 cars.
John Newell, *Gen. Man* ....Chicago, Il
P. P. Wright, *Gen. Supt* ....Cleveland, O
A. C. Armstrong, *Pur. Agt* ....Cleveland, O
James Sedgley, *Gen. M. M* ....Cleveland, O.
John Kirby, *Gen. M. C. B* ....Cleveland, O.
Buffalo Div.: C. B. Couch, *Supt* .....Cleveland, O.
J. S. Graham, *M. M* ....Buffalo, N. Y.
A. C. Robson, *M. C. B* ....Buffalo, N. Y.
Frank. Div.: G. H. McIntire, *Supt.* Stoneboro, Pa.
Erie Div.: C. B. Couch, *Supt* ....Cleveland, O.
L. O. Gassett, *M. M* ....Cleveland, O.
J. Withycombe, *M. C. B* ....Cleveland, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.* Cleveland, O.
J. M. Sanborn, *M. M* ....Norwalk, O.
W. O. Smith, *M. C. B* ....Norwalk, O.
Mich. Div.: J. E. Curtis, *Supt* ....Toledo, O.
Det. Div.: T. J. Charlesworth, *Supt.* Detroit, Mich.
Lansing Div.: W. H. Caniff, *Supt.* .Lansing, Mich.
Western Div.: J. H. Parsons, *Supt* ... Chicago, Ill.
G. W. Stevens, *M. M.* (M. S. Divs.). Elkhart, Ind.
Frank O. Bray, *M. C. B* ....Adrian, Mich.
Lebanon Springs R. R. 4-8½ g.
W. C. Alstyne, *Manager* .... Albany, N. Y.
J. K. Hotaling, *Pur. Agt* ....Albany, N. Y.
Geo. Tefft, *M. M* ....Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 545 m. 321 lo. 33,817 c.
Robt. H. Sayre, *Gen. Supt* ....Bethlehem, Pa.
H. S. Goodwin, *Asst. Gen. Supt* Bethlehem, Pa.
L. Chamberlain, *Pur. Agt* .... Philadelphia, Pa.
John S. Lentz, *M. C. B* .... Packerton, Pa.
N. J. Div.: H. E. Packer, *Supt.* .New York, N. Y.
John I. Kinsey, *M. M* ....So. Easton, Pa.
Coal Rds.: J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
P. Hofecker, *M. M* ....Weatherly, Pa.
John Campbell, *M. M* ....Delano, Pa.
B. M. Div.: A. G. Brodhead, *S.* .Mauch Chunk, Pa.
D. Clark, *M. M* ....Hazleton, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.* Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, *Supt* ....Sayre, Pa.
J. N. Weaver, *M. M* .... Waverley, Pa.
Ligonier Valley R. R. 3 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager* ... Pittsburg, Pa.
Geo. Lenft, *Supt. & P. Agt* ....Latrobe, Pa.
Little Rock, Miss. River & Texas Ry.
4-8½ g. 160 m. 12 lo. 260 cars.
J. A. Woodson, *G. S. & P. A.* Little Rock, Ark.
F. Hufsmith, *M. M. & C. B.* .Arkansas City, Ark.
Little Rock & Fort Smith. 4-8½ g. 168 m. 12 lo. 353 c.
T. Hartman, *Gen. Supt* ....Little Rock, Ark.
James Eblin, *M. M* ....Argenta, Ark.
James Malone, *M. C. B.* ....Argenta, Ark.
Long Island R. R. 4-8½ g. 325 m. 79 lo. 740 cars.
I. D. Barton, *Supt* ....Long Island City, N. Y.
Benj. Norton, *Pur. Agt.* Long Island City, N. Y.
C. A. Thompson, *M. M. & C. B.* do.
Louisville, New Albany & Chicago Ry.
4-8½ g. 380 miles 33 lo. 2,800 cars.
John MacLeod, *Gen. Supt* ....Louisville, Ky.
H. O. Nourse, *Pur. Agt* .... Louisville, Ky.
Josiah Bettis, *M. M. & C. B.* ..New Albany, Ind.
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 691 c.
Webster Snyder, *Gen. Man* ....Louisville, Ky.
R. G. Butler, *Gen. Supt* ....Louisville, Ky.
C. F. Martin, *Pur. Agt.* ....Louisville, Ky.
F. M. Mast, *M. M* ....Evansville, Ind.
Louisville & Nashville R. R.
5 g. 2,072 m. 316 lo. 6,131 cars.
Fred. de Funiak, *Gen Man* ....Louisville, Ky.
G. C. Breed, *A. Gen. Man. & Pur. Agt.* do.
D. W. C. Rowland, *Gen. Supt. Trans.* do.
Reuben Wells, *Supt. Mach* .... Louisville, Ky.
Louisv. Divs.; and Louisv., Cin. & Lex. Ry. (Cin. Div.)
J. G. Metcalf, *Supt* ....Louisville, Ky.
P. Leeds, *M. M.* (Lo. Div.) ..... Louisville, Ky.
J. W. Luttrell, *M. M.* (Cin. Div.). Louisville, Ky.
W. P. Pike, *M. M.* (2d & C. Div.). Bowling Green, Ky.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
W. H. Thomas, *M. M* ....Nashville, Tenn.
S. & N. A. Div.: E. Marsh, *Supt* Birmingham, Ala.
C. W. White, *M. M* ....Birmingham, Ala.
Mob. & M.; N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
M. S. Belknap, *Supt* ....Montgomery, Ala.
J. N. Hall, *M. M.* (Mont. Shops). Montgomery, Ala.
N. O. Div.: J. T. Harrihan, *Supt.* New Orleans, La.
Wm. Adair, *M. M* .... Mobile, Ala.
Memp. Div.: W. Colcamp, *Supt* Memphis, Tenn.
J. V. Slusser, *M. M* ....Memphis, Tenn.
St. L. Div.: J. Montgomery, *Supt.* Evansville, Ind.
Thos. Walsh, *M. M* ....Mt. Vernon, Ill.
Pensacola and So. Div. Pens. & Selma Rds.:
R. B. Small, *Supt* ....Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m.
J. H. Wilkins, *Pr. & Supt* ....Louisville, Ga.

M

Maine Central R. R. 4-8½ g. 355 m. 58 lo. 1,335 c.
Payson Tucker, *Supt* ....Portland, Me.
Ira K. Russell, *For. Mach. Sh* .. Waterville, Me.
C. H. Kenison, *For. Car Sh* ....Augusta, Me.
Manchester & Keene R. R. (*See B. L. & C.*)
B. F. George, *Asst. Supt* ....Keene, N. H.
Manhattan Ry. 4-8½ g. 32 m. 203 lo. 596 pass. c.
Frank K. Hain, *Gen. Man* .....New York, N. Y.
James Tobin, *Pur. Agt* ....New York, N. Y.
C. L. Green, *Supt* ....New York, N. Y.
T. W. Peeples, *M. M* ....New York, N. Y.
H. A. Webster, *M. C. B* ....New York, N. Y.
Marietta & Cin. R. R. 4-8½ g. 312 m. 65 lo. 1,422 c.
Jas. H. Stewart, *Supt* .... Cincinnati, O.
E. Bosley, *M. M* ....Chillicothe, O.
Marietta & North Georgia R. R. 3 g. 24 m. 1 lo. 5 c.
J. B. Glover, *Supt. & P. Agt* ....Marietta, Ga.
E. A. Withers, *M. M* ....Marietta, Ga.
Marquette, Houghton & Ontonagon R. R.
4-8½ g 87 m. 30 lo. 2,074 cars.
Samuel Schoch, *Gen. Man* .....Marquette, Mich.
R. M. McCauley, *Pur. Agt* ....Marquette, Mich.
W. H. Williams, *M. M* ....Marquette, Mich.
H. D. Lyons, *M. C. B* ....Marquette, Mich.
Massachusetts Central R. R. 4-8½ g. 48 m.
N. C. Munson, *Gen. Man* ....Boston, Mass.
E. G. Allen, *Supt. & P. A* ....Boston, Mass.
S. H. Munson, *Supt. M. P.* ..So. Sudbury, Mass.
McKean & Buffalo R. R. 4-8½ g. 22 m. 2 lo. 8 cars.
S. G. Godden, *Supt* ....Smethport, Pa.
Alex. White, *Pur. Agt* ....Smethport, Pa.
Memphis & Charleston R. R. (*See E. Tenn. Va. & Ga.*)
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 272 c.
E. K. Sibley, *G. Man. & P. A.* .Little Rock, Ark.
Wm. E. Smith, *Supt* ....Memphis, Tenn.
Thos. Rennell, *M. M* ....Argenta, Ark.
P. Twitchell, *M. C. B* ....Argenta, Ark.
Mexican Central Ry.
Rudolph Fink, *Gen. Man* ....City of Mexico.
J. H. Garner, *Supt* ....City of Mexico.
Howard Hinckley, *Pur. Agt* .... Boston, Mass.
F. W. Johnson, *M. M* ....City of Mexico.
J. H. O'Brien, *M. C. B* ....City of Mexico.
Mexican National Ry. (*See Tex.-Mex.*)
Michigan Cen. R. R. 4-8½ g. 958 m. 233 lo. 6,552 c.
H. B. Ledyard, *Gen. Man* ....Detroit, Mich
E. C. Brown, *Asst. Gen. Supt* ....Jackson, Mich
Allan Bourn, *Pur. Agt* ....Detroit, Mich
S. H. Edgerly, *Gen. M. M* ....Jackson, Mich
Robert Miller, *Gen. M. C. B* ....Detroit, Mich
East Div.: D. S. Sutherland, *Supt.* Detroit, Mich
Bay City, Saginaw & Mackinaw Divisions:
W. A. Vaughan, *Supt* ....Bay City, Mich.
R. P. Baillie, *M. M* ....Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, *Supt* ....Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
Middleburg & Schoharie; and
Schoharie Valley R. Rs. 4-8½ g. 10 m. 2 lo. 4 cars
S. S. Danforth, *Gen. Supt* ....Middleburg, N. Y.
Midland of Canada. 4-8½ g. 143 m. 12 lo. 503 cars.
Geo. A. Cox, *Gen. Man* ....Peterborough, Ont.
W. B. Ferguson, *Gen. Supt.* Peterborough, Ont.
C. H. Crofts, *Storekeeper* ...Peterborough, Ont.
Wm. Marling, *Mech. Supt* ....Port Hope, Ont.
Edward Douglas, *M. C. B* ....Port Hope, Ont.
Wm. Polson, *M. M* (G. J. Ry.) ...Belleville, Ont.
Victoria Div.: F. B. Polson, *M. M* ..Lindsay, Ont.
H. H. Harry, *M. C. B* ....Lindsay, Ont.
Toronto & Nipissing Div. 3-6 g. 105 m. 12 lo. 211 c.
J. Haggas, *M. M* ....Uxbridge, Ont.
Chas. E. Caron, *M. C. B* ....Uxbridge, Ont.
Midland No. Car. Ry. 4-8½ g. 95 m. 9 lo. 54 cars.
J. W. Andrews, *Gen. Man* .... Newbern, N. C.
Jno. P. Caddagan, *Pur. Agt* ....Newbern, N. C.
J. W. Andrews, *Supt* ....Goldsboro, N. C.
B. Manly, *Supt. of Mach* ....Newbern, N. C.
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 250 m. 28 lo. 809 cars.
H. G. H. Reed, *Gen. Man. & P. Agt.* Milwaukee, Wis.
J. Donahue, *Supt* ....Milwaukee, Wis.
Chas. S. Hayden, *Asst. Supt* ...Manitowoc, Wis.
David B. Curtis, *Asst. Supt* .... Oshkosh, Wis.
John Hickey, *M. M* ....Manitowoc, Wis.
Milwaukee & Northern
C. F. Dutton, *Gen. Supt* ....Milwaukee, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 42 cars.
Chas. E. Holland, *Pr. & Supt* ...Hancock, Mich.
W. H. Carr, *Pur. Agt* ....Hancock, Mich.
T. J. Shellhorn, *M. M* .... Hancock, Mich.
C. Angie, *M. C. B* ....Hancock, Mich.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 20 m. 2 lo. 2 motors 39 cars.
Wm. McCrory, *Supt. & Pur. Agt.*, and
R. Curtis, *M. M* ....Minneapolis, Minn.
Minneapolis & St. L. Ry. 4-8½ g. 506 m. 60 lo. 1,850 c.
C. H. Hudson, *Gen. Man* ....Minneapolis, Minn.
E. B. Parke, *Pur. Agt* ....Minneapolis, Minn.
E. Ryder, *Supt* ....Minneapolis, Minn.
H. A. Towne, *Supt. of Mach.* Minneapolis, Minn.
Mississippi & Tenn. R. R. 5 g. 101 m. 11 lo. 194 c.
M. Burke, *Supt* ....Memphis, Tenn.
J. C. Ramsey, *M. M* ....Memphis, Tenn.
S. J. Bolton, *M. C. B* ....Memphis, Tenn.

Missouri Pacific Ry. 4-8½ g. 2,132 m. 293 lo. 8,035 c.
A. A. Talmage, Gen. Man. St. Louis, Mo.
A. W. Dickinson, Asst. Gen. Supt. St. Louis, Mo.
R. B. Lyle, Pur. Agt. St. Louis, Mo.
John Hewitt, Supt. Mach. St. Louis, Mo.
John Hodge, Supt. Car Dep. St. Louis, Mo.
Main Line, Warder Cumming, Supt. Sedalia, Mo.
C. L. Dunham, Supt. W'n D'n. Kansas City, Mo
Le Roy Bartlett, M. M. St. Louis, Mo.
Geo. Walshe, M. M. Sedalia, Mo.
Ks. & Tex. Div., J. M. Eddy, Supt. Sedalia, Mo.
J. C. Barber, Asst. Supt. Car Dep. Sedalia, Mo.
Wm. T. Small, M. M. Parsons, Kan.
Dallas, Ex., L. L. Keller, Supt. Dallas, Tex.
Cen. Br. Div., W. W. Fagan, Supt. Atchison, Kan.
H. V. Faries, M. M. Atchison, Kan.
S. Irwin, Asst. Supt. Car Dep. Atchison, Kan
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, Trustee. Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 5 lo. 80 cars.
W. L. Clark, Gen. Supt. Columbus, Ga.
J. C. Albrecht, M. M. Columbus, Ga.
A. J. Nix, M. C. B. Columbus, Ga.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,180 cars.
A. L. Rives, V. Pr. & Gen. Man. Mobile, Ala.
R. H. Briggs, Gen. M. M. Whistler, Ala.
J. T. Booth, M. C. B. Whistler, Ala.
So'n Div., I. G. Motley, Supt. Mobile, Ala.
John Fitzgerald, M. M. Macon, Miss.
No'n Div.: E. S. Horsford, Supt. Jackson, Tenn.
M. T. Carson, M. M. Jackson, Tenn.
Mobile & Spring Hill R. R. 5 g. 8 m. 10 lo. 90 cars.
F. Ingate, Supt. Mobile, Ala.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 3 cars.
G. B. Weistling, Supt. & P. A. Mont Alto, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 76c.
W. A. Stowell, Supt. Montpelier, Vt.
Morgan's Louisiana & Tex. R. R. 4-8½ g. 165 m.
G. Pandeley, Supt. New Orleans, La.
C. Trumpy, Pur. Agt. New Orleans, La.
N. Tilton, M. M. Algiers, La.
Wm. O'Brien, M. C. B. Algiers, La.
Muncy Creek Ry. 4-8½ g. 10 m.
Benj. G. Welch, Rec. & P. Agt. Hughesville, Pa.
J. V. Chamberlain, Supt. & M. M. do.

N

Nashville, Chattanooga & St. Louis R'y.,
5 g. 508 miles 87 lo. 1,521 cars.
F. de Funiak, Gen. Man. Louisville, Ky.
J. W. Thomas, G. Supt. & P. Agt. Nashville, Tenn.
M. J. C. Wrenne, Supt. Nashville, Tenn.
James Cullen, M. M. Nashville, Tenn.
J. G. Sawyer, M. C. B. Nashville, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 60 m. 4 lo. 32 c.
Belton Mickel, Supt. Natchez, Miss.
Naugatuck R. R., 4-8½ g. 61 miles, 12 lo. 334 cars.
Geo. W. Beach, Supt. Waterbury, Ct.
Henry Hanford, M. M. Bridgeport, Ct.
Geo. W. Gray, M. C. B. Bridgeport, Ct.
Nevada Central R. R. (See Union Pac.)
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, Supt. Grass Valley, Cal.
Jas. McCormick, M. M. & C. B. Grass Valley, Cal.
New Brunswick Ry. 4-8½ g. 194 m. 12 lo. 266 cars.
E. R. Burpee, Supt. Gibson, N. B.
Alfred Seely, Pur. Agt. Gibson, N. B.
Jesse Mathews, M. M. Gibson, N. B.
T. N. Burpee, M. C. B. Gibson, N. B.
New Brunswick & Can. Ry. 4-8½ g. 127 m. 12 lo. 184c.
Henry Osborn, G. M. & P. A. St. Andrew's, N. B.
John Stewart, Supt. St. Stephen, N. B.
Thos. Armstrong, M. M. St. Andrew's, N. B.
G. Houlton, M. C. B. St. Andrew's, N. B.
New Castle & Oil City R. R. 4-9 g. 38 m. 4 lo. 30 cars.
A. Vandiwort, Supt. New Castle, Pa.
New Haven & Derby R. R. 4-8½ g. 13 m. 3 lo. 58 c.
E. S. Quintard, Supt. New Haven, Conn.
J. M. Whitlock, M. M. & C. B. New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 135 m. 26 lo. 572 c.
C. A. Goodnow, Supt. New Haven, Ct.
C. N. Yeamans, Pur. Agt. New Haven, Ct.
Henry Fox, M. M. New Haven, Ct.
John Sweeny, M. C. B. New Haven, Ct.
New Jersey & New York Ry. 6 g. 43 m. 6 lo. 40 c.
J. D. Hasbrouck, Gen. Man. Jersey City, N. J.
J. S. Drake, Supt. & M. M. Hillsdale, N. J.
L. B. Van Wagonen, M. C. B. Hillsdale, N. J.
New Jersey Southern Ry. (See Central, N. J.)
New London Northern R. R. (See Central Ver.)
New Orleans Pacific Ry. 5 g. 85 m. 10 lo. 206 cars.
H. S. Morse, Supt. New Orleans, La.
E. R. Smith, M. M. & C. B. New Orleans, La.
N. Y. Central & Hudson River R.R.
4-8½ g. 962 m. 676 lo. 22 539 cars.
J. M. Toucey, Gen. Supt. New York, N. Y.
R. C. Moore, Pur. Agt. New York, N. Y.
Wm. Buchanan, Supt. M. P. New York, N. Y.
L. Garey, Supt. Car Dept. New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, Supt. do.
P. McQ. Gibson, M. M. New York, N. Y.
C. E. Garey, M. C. B. Morrisania, N. Y.
Hud. Riv. Div.: C. M. Bissell, Supt. N. York, N. Y.
Peter Smith, M. C. B. New York, N. Y.
E'n Div.: Zenas C. Priest, Supt. Utica, N. Y.
G. B. Van Vorst, M. M. West Albany, N. Y.
D. Hoit, M. C. B. West Albany, N. Y.
W'n Div.: Geo. H. Burrows, Supt. Rochester, N. Y.
Amos Gould, M. M. E. Buffalo, N. Y.
S. L. White, M. M. Syracuse, N. Y.
E. A. Olmstead, M. C. B. E. Buffalo, N. Y.
C. H. Burchard, M. C. B. E. Rochester, N. Y.
Ed. Donaby, M. C. B. Niagara Falls, N. Y.
N. Y. Chic. & St. L. Ry. 4-8½ g. 269 m. 36 lo. 1,063c.
L. Williams, Gen. Man. Cleveland, O.
H. L. Morrill, Gen. Supt. Cleveland, O.
Eas'tn Div.: Wallace McGrath, Supt. Erie, Pa.
Mid. Div.: C. H. Cory, Supt. Fostoria, O.
West'n Div.: M. E. Wattles, Supt. Chicago, Ill.
New York City & Northern. 4-8½ g. 52 m. 7 lo. 91 c.
F. S. Gannon, Gen. Supt. High Bridge, N. Y.
M. McNally, M. of M. High Bridge, N. Y.
New York, Lake Erie & Western R. R.
4-8½ g. 1,020 m. 544 loco. 24,400 cars.
Robt. Harris, V. Pr. & G. Man. New York, N.Y.
E. S. Bowen, Gen. Supt. New York, N. Y.
J. A. Hardenburg, Pur. Agt. New York, N. Y.
F. M. Wilder, Supt. M. P. & M. Susqueh'a, Pa.
E'n Div.: E. O. Hill, Supt. Jersey City, N. J.
J. H. Vreeland, M. M. Jersey City, N. J.
J. N. Mileham, M. C. B. Jersey City, N. J.
Del. Div.: Chas. Neilson, Supt. Port Jervis, N. Y.
J. Van Vechten, M. M. & C. B. Pt. Jervis, N. Y.
Susq. Div.: R. B. Cable, Supt. Elmira, N. Y.
V. Blackburn, M. M. Susquehanna, Pa.
D. B. Goodell, M. C. B. Elmira, N. Y.
Buf. & R. Divs.: C. W. Gardner, Supt.; and
G. B. Ross, M. M. Buffalo, N. Y.
M. Wilder, M. C. B. Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, Supt. do.
W'n Div.: W. B. Coffin, Supt. Hornellsville, N. Y.
E. H. Griggs, M. M. Hornellsville, N. Y.
New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 102 lo. 2,416 cars.
E. M. Reed, V. P. & Gen. Man. New Haven, Ct.
R. N. Dowd, Pur. Agt. New Haven, Ct.
N. Y. & N. H. Div.; J. T. Moody, Supt. New York.
Shore Div.: W. H. Stevenson, Supt. N. Haven, Ct.
H. Kettendorf, Supt. M. P. New Haven, Ct.
Jas. Denver, M. C. B. New Haven, Ct.
Hart. Div.: C. S. Davidson, Supt. Hartford, Ct.
John Henny, Jr., Supt. M. P. & M. C. B. do.
New York, Ontario & Western Ry.
4-8½ g. 345 m. 79 lo. 1,539 cars.
Jas. E. Childs, Gen. Supt. Middletown, N. Y.
Chas. Clark, Pur. Agt. Middletown, N. Y.
Edw. Minshull, M. M. & C. B. Middletown, N. Y.
Mid. Div.: N. R. Hankins, Supt. Middletown, N. Y.
No'n Div.: C. W. Lanpher, Supt. Norwich, N. Y.
New York, Pennsylvania & Ohio R. R.
4-8½ g. 564 m. 215 lo. 7,387 cars.
P. D. Cooper, Gen. Man. Cleveland, Ohio.
J. M. Ferris, Supt. Trans. Cleveland, Ohio.
J. H. Holway, Pur. Agt. Cleveland, Ohio.
Wm. Fuller, Gen. M. M. & C. B. Cleveland, O.
S. V. Smith, Asst. Gen. M. C. B. Kent, Ohio.
E'n Div.: A. L. Dunbar, Supt. Meadville, Pa.
J. A. Cooper, M. M. Meadville, Pa.
D. S. Dockstader, M. C. B. Meadville, Pa.
J. F. Fosdick, For. Car Rep. Salamanca, N. Y.

W'n Div.: J. W. Alsop, Supt. Galion, O.
Wm Hill, M. M. Galion, O.
J. W. Holmes, For. Car Rep. Galion, O.
Geo. Wilson, For. Car Rep. Dayton, Ohio.
Maho'g Div.: N. F. Wood, Asst. Supt. Cleveland, O.
N. Wright, M. M. Cleveland, O.
C. N. Thorp, M. C. B. Cleveland, O.
New York, Providence & Boston R. R.
4-8½ g. 72 m. 29 lo. 430 cars.
J. B. Gardner, Supt. Providence, R. I.
Giles F. Ward, Pur. Agt. Stonington, Conn.
J. H. Anderson, M. M. & C. B. Providence, R. I.
N. Y., Susquehanna & W'n. 4-9 g. 86 m. 20 lo. 350 c.
H. M. Britton, Gen. M. & P. A. New York, N. Y.
W. C. Ennis, M. M. & C. B. Wortendyke, N. J.
New York, West Shore & Buffalo Ry.
Chas. Paine, Gen. Man. New York, N. Y.
Howard Fry, Supt. M. P. New York, N. Y.
New York, Woodhaven & Rockaway R. R.
4-8½ g. 26 m. 8 lo. 101 cars.
J. M. Lunt, Supt. & P. Agt. Hunter's Pt., L. I.
W. B. Turner, M. M. Hunter's Point, L. I.
N. Y. & Greenwood Lake Ry. 4-8½ g. 42 m. 8 lo. 53 c.
J. H. Tinney, Acting Supt. Jersey City, N. J.
J. A. Hardenburg, Pur. Agt. Jersey City, N. J.
G. A. Hill, M. M. Pompton, N. J.
N. Y. & Manhattan Beach Ry. 3 g. 23 m. 12 lo. 128 c.
D. C. Corbin, Man. Dir. New York, N. Y.
O. Fairhurst, M. M. Greenpoint, L. I.
New York & New England R. R.
4-8½ g. 403 m. 127 lo. 3,326 cars.
S. M. Felton, Jr., Gen. Man. Boston, Mass.
W. W. McKim, Pur. Agt. Boston, Mass.
A. K. Mansfield, Supt. M. P. Boston, Mass.
Elias E. Pratt, M. C. B. Norwood, Mass.
Nor. Div.: P. St. M. Andrews, Supt. Norwich, Ct.
Richard Colburn, M. M. Norwich, Ct.
Prov. Div.: L. W. Palmer, Supt. Providence, R. I.
Hfd. Div.: T. W. Kennan, Supt. Hartford, Ct.
E. M. Humstone, M. M. Hartford, Ct.
Newburg, Dutchess & Conn. R. R. 4-8½ g. 58 miles.
C. L. Kimball, Gen. Supt. Mattewan, N. Y.
W. G. Van Buskirk, M. M. & C. B. do
Norfolk & Western R. R. 5 g. 428 m. 82 lo. 1,220 c.
Henry Fink, 2d V. Pr. & Gen. Man. Lynchb'g, Va.
W. C. De Armond, Pur. Agt. Philadelphia, Pa.
C. Blackwell, Supt. M. P. Roanoke, Va.
Va. & Tenn. Div.: F. Sterk, M. M. Lynchburg, Va.
Frank Huger, Supt. Lynchburg, Va.
W. A. Morgan, M. C. B. Lynchburg, Va.
Nor. & Pt. Div.: N. M. Osborne, Supt.,
J. T. Robinett, M. M. & C. B. Petersburg, Va.
North-Eastern R. R. of Ga. 5 g. 40 m. 2 lo. 18 cars.
H. R. Bernard, Supt. Athens, Ga.
Jno. J. Longest, M. C. B. Athens, Ga.
North-Eastern R. R. (S. C.) (See Wil. & Wel.
North Pacific Coast R. R. 3 g. 80 m. 12 lo. 316 cars.
David Nye, Gen. Supt. San Rafael, Cal.
W. F. Russell, Pur. Agt. San Francisco, Cal.
J. Fowler, M. M. Sancelito, Cal.
North-Western Ohio Ry. (See Penna. Co.)
Northern (N. H.), and Concord & Claremont Rys.
4-8½ g. 173 m. 25 lo. 569 cars.
Geo. E. Todd, Supt. Concord, N. H.
Ed. Studley, M. M. & C. B. & Pur. Agt. do.
Northern (N. J.) R. R. (See N. Y., L. E. & W'n.)
Northern Central Ry. (See Penna. (R.R.)
North'n Pacific R. R. 4-8½ g. 1,193 m. 104 lo. 3,089 c.
Herman Haupt, Gen. Man. St. Paul, Minn.
John H. Ames, Pur. Agt. St. Paul, Minn.
Geo. W. Cross, Supt. Trans. St. Paul, Minn.
Geo. W. Cushing, Supt. M. P. & M. St. Paul, Minn.
St. P. & Minn. Divs.: B. McHugh, Supt., do.
A. P. Farrar, Supt. Mach. Brainerd, Minn.
H. J. Small, Act. M. M. do.
Dakota Div.: C. T. Hobart, Supt. Fargo, Dak.
A. Rupert, M. M. Fargo, Dak.
Mo. Div.: D. R. Taylor, Supt. Mandan, Dak.
E. F. Doran, M. M. Mandan, Dak.
Yell'st'e Div.: S. R. Ainslie, Supt. Glendive, Mont.
S. L. Bean, M. M. do.
(2) Western Div.: J. W. Sprague, Gen Supt.; and
Otis Sprague, Supt. New Tacoma, W. T.
H. D. Sanborn, Pur. Agt. Portland, Ore.
F. C. Ford, M. M. New Tacoma, W. T.
S. Wishart, M. C. B. New Tacoma, W. T.
Pend d'Ore Div.: H. W. Fairweather, Supt.; and
J. F. Curtis, M. M. Ainsworth, W. T.
Northern & North-W'n Ry. 5-6 & 4-8½ g. 50 lo. 1,033 c.
James Webster, Supt. Toronto, Can.
C. W. Postlethwaite, Pur. Agt. Toronto, Can.
P. Clarke, M. M. Toronto, Can.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 122 m. 33 lo. 1,160 cars.
A. A. Gaddis, Gen. Man. Malone, N. Y.
Abr. Klohs, Supt. & M. M. Malone, N. Y.
Ohio Central R. R. 4-8½ g. 230 m. 30 lo. 3,201 cars.
John E. Martin, Gen. Man. Toledo, O.
John E. Martin, Gen. Supt. Toledo, O.
W. H. Vandegrift, Supt. Toledo, O.
F. W. Stewart, Pur. Agt. Toledo, O.
J. B. Morgan, M. M. & C. B. Bucyrus, O.
Ohio Southern. 4-8½ g. 119 m. 19 lo. 623 cars.
Ford Woods, Supt. Springfield, O.
H. C. Norton, Pur. Agt. Indianapolis, Ind.
W. B. Warren, M. M. Springfield, O.
Ohio & Mississippi Ry. 4-9 g. 615 m. 14 lo. 2,501 cars.
W. W. Peabody, Gen. Supt. Cincinnati, O.
G. E. Atwood, Pur. Agt. Cincinnati, O.
Cin. Div.: C. B. Cole, Supt. Seymour, Ind.
John Thumser, M. M. Seymour, Ind.
J. P. Coulter, M. C. B. Aurora, Ind.
Arthur Donaldson, M. M. Vincennes, Ind.
St. L. & Sp. Div.: C. M. Stanton, Supt. St. Louis, Mo.
J. W. Stokes, M. M. (Spring. Div.) Pana, Ill.
Louisv. Div.: C. B. Cole, Supt. Louisville, Ky.
Oil City & Ridgway R. R. 4-8½ g. 6 m. 1 lo. 43 cars.
A. F. Kent, Gen. Man. Oil City, Pa.
Old Colony R. R. 4-8½ g. 463 m. 110 lo. 2,862 cars.
J. R. Kendrick, Gen. Supt. Boston, Mass.
Main Li. Div.: J. H. French, Supt. Boston, Mass.
R. W. Husted, Pur. Agt. Boston, Mass.
J. K. Taylor, M. M. Boston, Mass.
A. Gleason, M. C. B. Boston, Mass.
Cape Cod Div.: C. H. Nye, Supt. Hyannis, Mass.
No. Div.: S. A. Webber, Supt. Fitchburg, Mass.
George W. Reynolds, M. M. Taunton, Mass.
Sam. Stevens, M. C. B. Taunton, Mass.
Olean, Bradford & Warren; Bradford; Kinzua; and
Kendall & Eldred R. Rs. 3 g. 38 m. 9 lo. 222 cars.
J. W. Watson, Gen. Supt. Olean, N. Y.
J. H. Poole, Pur. Agt. Buffalo, N. Y.
Charles Turner, M. M. & C. B. Olean, N. Y.
Ontario Southern Ry. 4-8½ g. 24 m. 3 lo. 40 c.
E. R. Mills, Supt. Sodus Point, N. Y.
S. B. Stuart, Pur. Agt. Sodus Point, N. Y.
W. H. Cook, M. C. B. Sodus Point, N. Y.
Oregon Ry. & Nav. Co. 4 8½ g. 225 m. 31 lo. 930 cars.
C. H. Prescott, Manager. Portland, Ore.
J. M. Buckley, Asst. Man. & Act. Supt. do.
J. M. Fillmore, Supt. (R. Div.) Portland, Ore.
K. Von Oterendorf, Supt. (O. Div.) S. F'cisco, Cal.
J. M. Drake, Pur. Agt. Portland, Ore.
C. C. Hobart, Gen. M. M. The Dalles, Ore.
Chas. A. Phipps, M. C. B. The Dalles, Ore.
N. G. Div.: Wm. Reed, Man. Portland, Ore.
James Walch, M. M. Portland, Ore.
Oregon & California R. R. 4-8½ g. 200 m. 14 lo. 286 c.
R. Koehler, Act. Man. Portland, Ore.
J. Brandt, Gen. Supt. Portland, Ore.
A. Brandt, M. M. Portland, Ore.
Owensboro & Nashville R. R. 5 g. 35 m.
W. L. Gude, Gen. Supt. Owensboro, Ky.
H. M. Gable, M. M. & C. B. Owensboro, Ky.

P

Paducah & Elizabetht'n R.R. 5 g. 186 m. 19 lo. 536 c.
Robert Meek, Gen. Supt. Elizabethtown, Ky.
W. D. Robb, M. M. & C. B. Elizabethtown, Ky.
Painesville & Youngstown R. R. 3 g. 65 m. 7 lo. 319 c.
E. K. Hyndman, Gen. Man. Pittsburg, Pa.
J. A. Newcome, Supt. Painesville, O.
J. H. Jones, M. M. Painesville O.

Panama R. R. 5 g. 58 m. 14 lo. 534 cars.
H. A. Woods, Supt. Aspinwall, U. S. Col.
E. Z. Penfield, Pur. Agt. New York, N. Y.
Thomas S. O'Brien, M. M. Aspinwall, U. S. Col.
Parker & Karns City; and
Karns City & Butler R. Rs. 3 g. 27 m. 5 lo. 84 cars.
W. C. Moberly Gen. Supt. Parker City, Pa.
Philip Davies, M. M. Parker City, Pa.
Wm. Wolford, M. C. B. Parker City, Pa.
Passumpsic R. R. 4-8½ g. 165 m. 28 lo. 105 cars.
E. Raymond, Pres. & Pur. Agt. Boston, Mass.
H. E. Folsom, Supt. Lyndonville, Vt.
L. L. Brigham, M. M. Lyndonville, Vt.
L. F. Woodard, M. C. B. Lyndonville, Vt.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
Supt. & Pur. Agt. York, Pa.
E. H. Williams, M. C. B. York, Pa.
E. Div.: S. Dickey, Supt. Oxford, Pa.
G. R. Dickey, Pur. Agt. Oxford, Pa.
W. P. Kirk, M. M. Oxford, Pa.
Pennsylvania Co.'s (9) Roads.
4-9 g. 2,838 m. 817 lo. 29,432 cars.
Wm. Mullins, Gen. Pur. Agt. Pittsburg, Pa.
Joseph Wood, Supt. M. P. Fort Wayne, Ind.
(1) Clev. & Pittsb'g R. R. 4-9 g. 224 m. 97 lo. 3,336 c.
R. V. Smith, Asst. Gen. Man. Cleveland, O.
Philip Bruner, Supt. Wellsville, O.
W. F. Beardsley, Mast. of Mach. Cleveland, O.
(2 & 3) Erie & Ashtabula Rds. 178 m. 29 lo. 1,340 c.
John M. Kimball, Supt. Youngstown, O.
J. A. Wood, For. Shops. Erie, Pa.
(4) Indianap. & Vincennes Rd. 117 m. 11 lo. 303 cars.
Jas. J. Turner, Supt. Indianapolis, Ind.
M. M.
(5) Jeffersonville, Madison & Indianapolis R. R.
4-9 g. 217 m. 47 lo. 784 cars.
E. W. McKenna, Supt. Louisville, Ky.
Wm. Swanston, M. M. Jeffersonville, Ind.
Edw. Austin, M. C. B. Jeffersonville, Ind.
(6) Northwestern Ohio Ry. 4-9 g. 79 m.
J. S. Morris, Supt. Toledo, O.
(7) Pittsburg, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 278 lo. 6,782 cars.
E'n Div.: A. B. Starr, Supt. Allegheny, Pa.
Geo. J. Parkin, M. M. Allegheny, Pa.
W'n Div.: C. D. Law, Supt. Ft. Wayne, Ind.
F. D. Casanave, M. M. Ft. Wayne, Ind.
(8) Pittsburg, Cincinnati & St. Louis Ry.
4-9 g. 1,172 m. 336 lo. 6,482 cars.
Jas. McCrea, Gen. Supt. Columbus, O.
R. H. Soule, Supt. M. P. & M. Columbus, O.
P. & Col. Div.: E. B. Taylor, Supt. Dennison, O.
Ross Kells, M. M. Dennison, O.
A. K. Mansfield, M. C. B. Steubenville, O.
Robt. Curtis, M. M. Columbus, O.
Thos. Chamberlain, M. C. B. Columbus, O.
C. & M. V. Div.: W. F. Black, Supt. Zanesville, O.
Leroy Kells, M. M. Lancaster, O.
Daniel Jewell, M. C. B. Lancaster, O.
Li. Mi. Div.: Ralph Peters, Supt. Cincinnati, O.
Leroy Kells, M. M. Cincinnati, O.
M. P. Ford, M. C. B. Columbus, O.
Ind. Divs.: J. F. Miller, Supt. Richmond, Ind.
Geo. H. Prescott, M. M. Logansport, Ind.
Chas. H. Starr, M. C. B. Logansport, Ind.
M. J. Rogers, M. M. Indianapolis, Ind.
Chi. Div.: C. C. F. Bent, Supt. Logansport, Ind.
((9Terre Haute & Indianapolis R. R.
4-9 g. 374 m. 83 lo. 2,868 cars.
Joseph Hill, Gen. Supt. St. Louis, Mo.
C. R. Peddle, P. Agt. & Supt. M. P. & M.; and
E. D. Carter, M. C. B. Terre Haute, Ind.
Clinton Idler, M. M. Indianapolis, Ind.
Chas. Butler, M. M. Effingham, Ill.
A. W. Quakenbush, M. M. Logansport, Ind.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 2,704 m. 1,271 loco. 51,894 cars.
Frank Thomson, Gen. Man. Philadelphia, Pa.
Enoch Lewis, Pur. Agt. Philadelphia, Pa.
John Reilly, Supt. Trans. Philadelphia, Pa.
T. N. Ely, Supt. Mo. Po. (4 Gen. Divs.) Altoona, Pa.
(1) Pennsylvania R. R. Divs.
4-9 g. 1,105 m. 627 lo. 35,583 cars.
Charles E. Pugh, Gen. Supt. Altoona, Pa.
Phila. Div.: S. M. Prevost, Supt. Philadelphia, Pa.
H. D. Garrett, M. M. W. Philadelphia, Pa.
I. W. Van Houten, M. C. B. W. Phila., Pa.
Mid. Div.: H. H. Carter, Supt. Harrisburg, Pa.
E. L. Caum, M. M. Harrisburg, Pa.
Samuel W. Myers, M. C. B. Harrisburg, Pa.
Alt'a Div.: Wm. J. Latta, Supt. Altoona, Pa.
G. W. Strattan, M. M. Altoona, Pa.
John P. Levan, M. C. B. Altoona, Pa.
Pitts. Div.: Robert Pitcairn, Supt. Pittsburg, Pa.
D. O. Shaver, M. M. Pittsburg, Pa.
J. G. Stewart, M. C. B. Pittsburg, Pa.
W. Pa. Div.: A. P. Kirtland, Supt. Blairsville, Pa.
C. B. Street, M. M. Blairsville, Pa.
M. H. Fails, M. C. B. Blairsville, Pa.
Fred. Div.: J. B. Hutchinson, Supt. York, Pa.
Tyrone Div.: S. S. Blair, Supt. Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, Supt. Lewistown, Pa.
Bed. Div.: Thos. A. Roberts, Supt. Bedford, Pa.
Monong. Div.: David M. Watt, Supt. Pittsburg, Pa.
Wm. Lininger, M. M. Pittsburg, Pa.
2) United R. Rs. of N. J. Divs. 414 m. 257 lo. 4,668 c.
F. Wolcott Jackson, Gen. St. Jersey City, N. J.
N. Y. Div.: Robt. E. Pettit, Supt. Jersey City, N. J.
H. S. Hayward, At. St. M. P. Jersey City, N. J.
David H. Baker, M. C. B. Jersey City, N. J.
L. A. Bosdevex, M. M. Jersey City, N. J.
E. F. Bosdevex, M. C. B. Jersey City, N. J.
Belv. Div.: J. A. Anderson, Supt. Lambertv., N. J.
R. McDowell, M. M. Lambertville, N. J.
Amboy Div.: J. S. Buckalew, Supt. Camden, N. J.
Thos. Kerr, M. M. So. Amboy, N. J.
P. S. Bogart, M. C. B. So. Amboy, N. J.
(3) West Jersey R. R. 4-9 g. 163 m. 22 lo. 342 cars
Joseph Crawford, Supt. Camden, N. J.
W. McAllister, M. M. Camden, N. J.
C. C. Williams, M. C. B. Camden, N. J.
(4) Phila., Wilm. & Balt. R.R. 212 m. 86 lo. 1,488 c.
H. F. Kenney, Gen. Supt. Philadelphia, Pa.
S. A. Hodgman, M. M. Wilmington, Del.
Wm. Lundgren, M. C. B. Wilmington, Del.
Cen. Div.: L. K. Lodge, Supt. Philadelphia, Pa.
S. D. Danfield, M. M. & C. B. Chester, Pa.
Del. Div.: I. N. Mills, Supt. Philadelphia, Pa.
(5) Phila. & Erie R. R. Divs.: 376 m. 117 lo. 3,481 c.
R. Neilson, Gen. Supt. Williamsport, Pa.
A. O. Dayton, Supt. Mo. Po. Williamsport, Pa.
E'n. Div.: Thos. Gucker, Supt. Williamsport, Pa.
Sun. H. & W. Div: F. L. Sheppard, Supt.; and
W. F. Beardsley, M. M. Sunbury, Pa.
Mid. Div.: E. B. Westfall, Supt. Renova, Pa.
Wm. L. Holman, M. M. Renova, Pa.
West'n Div.: J. W. Reynolds, Supt. Erie, Pa.
W. T. Smith, M. M. Erie, Pa.
(6) Northern Central Ry. 4-9 g. 326 m. 152 lo. 6,163 c.
A. W. Sumner, Pur. Agt. Baltimore, Md.
Susq., Shamokin, Elmira & Canadaigua Divs.:
Robert Neilson, Gen. Supt. Williamsport, Pa.
A. O. Dayton, Supt. M. P. Williamsport, Pa.
Susq. Div.: Thos. Gucker, Supt. Williamsport, Pa.
Sham. Div.: Supt. Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, Supt. Elmira, N. Y.
Jas. Strode, M. M. Elmira, N. Y.
J. C. Dyott, M. C. B. Elmira, N. Y.
Baltimore Divs. of Northern Central; and
(7) Baltimore & Potomac R. R. 128 m. 29 lo. 356 c.
G. C. Wilkins, Supt. Baltimore, Md.
A. W. Sumner, Pur. Agt. Baltimore, Md.
J. M. Wallis, Supt. Mo. Po. Baltimore, Md.
J. M. Coale, M. M. Baltimore, Md.
G. W. Demarest, M. C. B. Baltimore, Md.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 2,871 c.
J. B. Smith, Gen. Supt. Dunmore, Pa.
And. Crane, M. M. Dunmore, Pa.
Geo. W. Simpson, M. C. B. Dunmore, Pa.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, Gen. Supt. Ridgeway, Pa.
Pensacola & Perdido R. R. 6 g. 8 m. 5 lo. 73 cars.
B. F. Simmons, Pr. & Supt. Pensacola, Fla.
H. W. Simmons, Pur. Agt. Pensacola, Fla.
R. G. Nicholl, M. M. & C. B. Pensacola, Fla.
Peoria, Decatur & Evansville Ry.
4-8½ g. 215 m. 12 lo. 725 cars.
G. L. Bradbury, Gen. Man. Peoria, Ill.
Supt. & Pur. Agt. Peoria, Ill.
P. Reilly, M. M. Mattoon, Ill.

Peoria & Farmington R. R. 4-8½ g. 25 m. 2 lo. 25 c.
D. P. Phelps, Gen. Man. Monmouth, Ill.
John F. Wallace, Supt. Farmington, Ill.
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 100 c.
Thos. B. Burnett, Gen. Supt. & P. A. Peoria, Ill.
R. F. Hurd, M. M. & C. B. Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, Supt. Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 131 cars.
R. M. Sully, Gen. Supt. Petersburg, Va.
L. E. Clark, Pur. Agt. Petersburg, Va.
R. B. Andrews, M. M. Petersburg, Va.
J. W. Fleming, M. C. B. Petersburg, Va.
Phila., Wilmington & Balt. R. R. (See Penna. R. R.)
Phila. & Atlantic City Ry. 3-6 g. 65 m. 11 lo. 134 cars.
F. S. Urie, Supt. & Pur. Agt. Philadelphia, Pa.
J. W. Wright, M. M. Camden, N. J.
E. Lippincott, M. C. B. Camden, N. J.
Phila. & Reading. 4-8½ g. 869 m. 516 lo. 21,960 cars.
John E. Wootten, Gen. Man. Philadelphia, Pa.
W. S. Wilson, Pur. Agt. Philadelphia, Pa.
Geo. Eltz, Supt. Trans. Reading, Pa.
L. B. Paxson, Eng. of Mach. Reading, Pa.
John H. Rankin, M. C. B. Reading, Pa.
No. Pa. & B. Brk. Div.: I. A. Sweigard, Supt., and
Jackson Richards, M. M. Philadelphia, Pa.
C. & W. Br.: D. C. Reinhart, Sup. Williamsport, Pa.
W. H. Ellis, M. M. Catawissa, Pa.
C. D. Ellis, M. C. B. Catawissa, Pa.
Leb. & Tr. Br.: H. W. Tracy, Supt. Pine Grove, Pa.
Coal Br.: J. H. Olhausen, Supt. Mahony Plane, Pa.
R. & C. Br.: A. M. Wilson, Supt. Columbia, Pa.
P. N. & N. Y. Rd.: W. M. Geary, S. Morristown, Pa.
S. & Le. Rd.: E. Dale, Supt. Reading, Pa.
Pittsburg, Bradford & Buffalo Ry. 3 g. 31 m. 4 lo. 79c
J. M. Dickey, Gen. Man. Foxburg, Pa.
M. Mandeville, Supt. Foxburg, Pa.
Pittsburg, Cincinnati & St. Louis Ry. (See Penna. Co.)
Pittsburg, Ft. Wayne & Chicago Ry. (See Penna. Co.)
Pittsburg Southern Ry. 3 g. 38 m. 4 lo. 64 cars.
Supt. & P. A. Pittsburg, Pa.
W. S. Marshall, M. M. Pittsburg, Pa.
E. B. Gosline, M. C. B. Pittsburg, Pa.
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 388 c.
James M. Bailey, Gen. Supt. Pittsburg, Pa.
A. C. Hays, Supt. Pittsburg, Pa.
Holmes Ward, M. M. Castle Shannon, Pa.
Wm. E. Long, M. C. B. Pittsburg, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 30 lo. 1,688 c.
W. C. Quincy, Gen. Man. Pittsburg, Pa.
R. W. Jones, Mast. Trans. Pittsburg, Pa.
S. W. Haines, M. M. Pittsburg, Pa.
Pittsburg & Western R. R. 3 g. 47 m. 2 lo. 76 cars.
E. K. Hyndman, Gen. Man. Pittsburg, Pa.
C. P. Ford, Pur. Agt. Allegheny, Pa.
W. L. Hofecker, M. M. Zelienople, Pa.
Port Huron & No.-Western Ry. 3 g. 105 m. 4 lo. 66 c.
H. McMorran, G. Man. & P. A. Port Huron, Mich.
I. R. Wadsworth, Supt. Port Huron, Mich.
Chas. Deifenbaugh, M. M. Port Huron, Mich.
Benj. Hillier, M. C. B. Port Huron, Mich.
Port Royal & Augusta Ry. 5 g. 112 m. 13 lo. 235 c.
J. N. Bass, Gen. Supt. Augusta, Ga.
Geo. Riley, M. M. Port Royal, S. C.
J. H. Milton, M. C. B. Port Royal, S. C.
Portland & Ogdensburg. 4-8½ g. 114 m. 9 lo. 289 c.
J. Hamilton, Gen. Supt. & P. A. Portland, Me.
Geo. H. Poor, M. M. Portland, Me.
W. G. Brewer, M. C. B. Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 7 lo. 230 c.
G. P. Wescott, Supt. & Pur. Agt. Portland, Me.
E. H. C. Tompson, For. of Mach. Portland, Me.
David Dow, For. of Car Repairs. Portland, Me.
Potomac, Fred.'g & Pied. R. R. 3 g. 38 m. 2 lo. 32 c.
W. M. Crafton, Supt. Fredericksburg, Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 64 c.
J. A. Perkins, Supt. Poughkeepsie, N. Y.
John L. Driscoll, M. M. Poughkeepsie, N. Y.
Prince Edward Island Ry. 3-6 g. 199 m. 17 lo. 280 c.
L. B. Archibald, Supt. & Pur. Agt.;
Jos. Unsworth, M. Supt. & Storekeeper; and
D. M. Fraser, M. C. B. Charlottetown, P. E. I.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 5 lo. 38 c.
Waterman Stone, Supt. Providence, R. I.
Rufus Smith, M. M. & C. B. Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 3 lo. 83 c.
Wm. Tinkham, Gen. Man. Providence, R. I.
G. T. Richardson, M. M. Providence, R. I.
Prov. & Worcester. 4-8½ g. 66 m. 30 lo. 858 c.
W. E. Chamberlain, Supt. Providence, R. I.
A. Griggs, Supt. L. & C. D. Providence, R. I.
Pullman's Palace Car Co. 472 passenger cars.
A. B. Pullman, 2d V.-Pr. & G. M. Chicago, Ill.
Geo. F. Brown, Gen. Supt. Chicago, Ill.
Wm. A. Angell, Pur. Agt. Chicago, Ill.
S. W. Bretzfield, Asst. Pur. Agt. New York, N.Y.
A. Rapp, Man. (Chicago Works) Chicago, Ill.
H. L. Spaulding, Man. (Det Shops) Detroit, Mich.
E. A. Benson, Supt. Shops. St. Louis, Mo.

Q

Quebec Central Ry. 4-8½ g. 139 m. 3 lo. 79 cars.
A. Steele, Supt. Sherbrooke, Que.
R. D. Morkill, Pur. Agt. Sherbrooke, P. Q.
Jas. Seiveright, M. M. Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 329 miles, 34 loco. 556 cars.
L. A. Senecal Gen. Supt. Montreal, Can.
W. E. Blumhart, Pur. Agt. Montreal, Can.
A. Davis, Mech. Supt. Montreal, Can.
Quebec & Lake St. John Ry. 4-8½ g. 24 m. 3 lo. 43 c.
J. G. Scott, Manager. Quebec, Can.
Frank Fournier, Supt. St. Raymond, P. Q.
John T. Eames, M. M. St. Raymond, P. Q.

R

Raleigh & Augusta Air-Line; Carolina Central;
Raleigh & Gaston R. Rs. 4-8½ g. 436 m. 48 lo. 978 c.
John C. Winder, Gen. Man. Raleigh, N. C.
Raleigh Rds. 4-8½ g. 194 m. 22 lo. 589 cars.
B. R. Harding, Supt. of Mach. Raleigh, N. C.
R. T. Bishop, M. C. B. Raleigh, N. C.
Carolina Cen. R.R. 4-8½ g. 242 m. 26 lo. 389 c.
V. Q. Johnson, Gen. Supt. Wilmington, N. C.
C. H. Roberts, Pur. Agt. Wilmington, N. C.
James Maglenn, M. of Mach. Laurinburg, N. C.
S. R. Ethridge, M. C. B. Laurinburg, N. C.
Rensselaer & Saratoga R.R. (See Del. & Hud. Can. Co.)
Rhinebeck & Connecticut. 4-8½ g. 42 m. 5 lo. 85 c.
J. H. Jones, Gen. Supt. Rondout, N. Y.
John Dykeman, M. M. Rondout, N. Y.
John H. Decker, M. C. B. Rondout, N. Y.
Richmond, Fredericksburg & Potomac R. R.
4-8½ g. 83 m. 14 lo. 165 cars.
E. T. D. Myers, Gen. Supt. Richmond, Va.
T. L. Courtney, Pur. Agt. Richmond, Va.
H. Khun, M. M. Richmond, Va.
W. H. Trainham, M. C. B. Richmond, Va.
Richmond & Alleghany R.R. 4-9 g. 250 m. 18 lo. 771c.
Gen. Man. Richmond, Va.
Geo. W. Agee, Supt. Richmond, Va.
J. P. Williams, Pur. Agt. Richmond, Va.
Geo. D. Harris, M. M. & C. B. Richmond, Va.
Richmond & Danville R. R. Co.'s Roads.
1,655 miles 217 loco. 3,616 cars.
T. M. R. Talcott, Gen. Man. Richmond, Va.
J. P. Minetree, Pur. Agt. Richmond, Va.
R. D. Wade, Supt. Mo. Po. Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 764 m. 131 lo. 2,480 cars.
Peyton Randolph, As. G. Man. Richmond, Va.
Rich. & Dan. Div.: 5 g. 255 m. 79 lo. 1,797 c.
Wm. H. Green, Supt. Richmond, Va.
T. W. Gentry, M. M. Richmond, Va.
J. B. Vaughan, For. Car Sh. Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, Supt. Raleigh, N. C.
W. H. Turrentine, M. M. Comp'y's Shops, N. C.
J. C. Holt, For. Car Sh. Comp'y's Shops, N. C.
Atlanta & Char. Air Line. 5 g. 286m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 37 c.
I. Y. Sage, Supt. Atlanta, Ga.
C. D. Wall, M. M. Atlanta, Ga.
Z. T. Smith, For. Car Sh. Atlanta, Ga.
(2) Charlotte, Col. & Aug. R. R. 5g. 239 m. 22 lo. 287 c.
G. R. Talcott, Supt. Columbia, S. C.
J. H. Green, M. M. (2 roads) Columbia, S. C.
J. H. Perkins, For. Car Sh. Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 218 c.
J. W. Fry, Supt. Columbia, S. C.
J. O. Meredith, For. E. & C. Rep. do.

(4) Virginia Midland Ry. 4–8½ g. 353 m. 41 lo. 631 c.
W. M. S. Dunn, *Eng. & Supt.* Alexandria, Va.
J. E. Waddey, *M. of M.* ...... Alexandria, Va.
J. T. Nalls, *M. C. B.* ...... Alexandria, Va.
Richmond & Petersburg R.R. 4–8½ g. 25 m. 8 lo. 130 c.
J. R. Kenly, *Supt.* .... Richmond, Va.
John O'Brien, *M. M.* .... Richmond, Va.
Rio Grande R. R. 3–6 g. 22 m. 3 lo. 39 cars)
M. J. Gomila, *Rec. & Gen. Man.* Brownsville, Tex.
G. W. Rendall, *M. M.* .... Brownsville, Tex.
M. Markwood, *M. C. B.* .... Brownsville, Tex.
Rochester & Pittsb'g. R.R. 4–8½ g. 108 m. 11 lo. 612 c.
Geo. E. Merchant, *Gen. Man.* ... Rochester, N.Y.
J. P. Hovey, *M. M.* .... Rochester, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4–8½ g. 113 m. 12 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt.* .Rock Island, Ill.
R. I. & P. Ry.: H. B. Ludlow, *A. Supt. & P. A.* do
Joseph Elder, *M. M.* .... Peoria, Ill.
R. I. & M. C. Rd.: B. T. Cable, *Supt.* R'k Island, Ill.
J. Parks, *M. M.* .... Rock Island, Ill.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 13 cars.
Eben Hillyer, *Supt.* .... Rome, Ga.
O. W. Harbin, *M. M. & C. B.* .... Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4–8½ g. 409 m. 51 lo. 1,248 cars.
E. A. Van Horne, *Gen. Supt.* ...... Oswego, N. Y.
Geo. W. B. Cushing, *Pur. Agt.* New York, N. Y.
Geo. H. Haselton, *M. M. & C. B.* .Oswego, N. Y.
Rumford Falls & Buckfield R.R. 4–8½ g. 29 m. 2 l. 42 c.
O. Hayford, *Supt.* .... Canton, Me.
O. Spaulding, *Pur. Agt.* .... Buckfield, Me.
E. R. Oldham, *M. M.* .... Buckfield, Me.

S

Sabine & East Texas Ry. 4–8½ g. 25 m. 5 lo. 306 c.
J. B. Morford, *Gen. Supt.* ..... Beaumont, Tex.
R. H. Cousins, *Supt.* .... Beaumont, Tex.
Sacramento & Placerville R. R. 4–8½ g. 49 m. 3 lo. 68 c.
J. B. Wright, *Supt. & P. A.* ... Sacramento, Cal.
A. J. Stevens *M. M.* .... Sacramento, Cal.
Benj. Welch, *M. C. B.* .... Sacramento, Cal.
Saginaw Bay & Northw'n R. R. 4–8½ g. 20 miles.
E. W. Gerrish, *Supt.* .... Pinconning, Mich.
F. T. Lillot, *Pur. Agt.* .... Pinconning, Mich.
And. Miller, *M. M.* .... Pinconning, Mich.
Saginaw Valley & St. Louis R. R. 4–8½ g. 35 m. 4 l. 64 c.
N. W. Merrill, *Supt.* .... Saginaw, Mich.
Allan Bourn, *Pur. Agt.* .... Detroit, Mich.
Geo. C. Watrous, *M. M.* .... Iona, Mich.
San Francisco & No. Pac. 4–8½ g. 112 m. 11 lo. 244 c.
Arthur Hughes, *Gen. Man.* .San Francisco, Cal.
H. C. Whiting, *Supt.* .... Petaluma, Cal.
P. E. Dougherty, *Pur. Agt.* San Francisco, Cal.
Ed. Reynolds, *M. M.* .... Donahue, Cal.
John Martin, *M. C. B.* .... Donahue, Cal.
San Luis Obispo & Santa Maria Val. R. R. 3 g. 11 m.
C.A. Haskin, *Supt. & P. Agt.* San Luis Obispo, Cal.
W. H. Masterman, *M. M.* San Luis Obispo, Cal.
J. M. Vincent, *M. C. B.* ... San Luis Obispo, Cal.
Savannah, Florida & W'n Ry. 5 g. 422 m. 50 lo. 695 c.
H. S. Haines, *Gen. Man.* .... Savannah, Ga.
R. G. Fleming, *Supt.* .... Savannah, Ga.
A. A. Aveilhé, *Pur. Agt.* .... Savannah, Ga.
James D. Hollister, *M. of Mach.* .Savannah, Ga.
Jos. W. Rowell, *For. Car Dept.* Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.).*
Schuylkill & Lehigh R. R. 4–8½ g. 43 miles.
Elbridge Dale, *Supt.* .... Reading, Pa.
Scoharie Valley R. R. *(See Middleburg & Sch.)*
Scioto Valley R. R. 4–8½ g. 131 m. 15 lo. 460 cars.
Geo. Skinner, *Supt.* .... Columbus, O.
R. Bromley, *M. M. & P. A.* ...... Portsmouth, O.
Seaboard & Roanoke R. R. 4–8½ g. 80 m. 21 lo. 381 c.
E. G. Ghio, *Mast. of Trans.* .... Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M.* Portsmouth, Va.
Shenandoah Valley R. R. 4–8½ g. 143 m. 15 lo. 104 c.
J. H. Sands, *Supt.* .... Hagerstown, Md.
W. C. De Armond, *Pur. Agt.* Philadelphia, Pa.
Chas. Blackwell, *Supt. of M. P.* .Roanoke, Va..
Jno. McCallister, *M. M.* .Shepherdstown, W. Va.
H. Groves, *M. C. B.* .Shepherdstown, W. Va.
Shenango & Allegheny R.R. 4–9½ g. 47 m. 6 lo. 156 c.
J. T. Blair, *G. Supt. & Pur. Agt.* Greenville, Pa.
Edw. Richardson, *M. M. & C. B.* Greenville, Pa.
Shepaug R. R. 4–8½ g. 38 m. 3 lo. 27 cars.
Edwin McNeill, *Supt.* .... Litchfield, Ct.
C. M. Allen, *M. M.* .... Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt.* ... Ripley, Miss.
W. H. Phelps, *M. M.* .... Ripley, Miss.
Sioux City & Pacific R. R. 4–8½ g. 427 m. 21 lo. 594 c.
P. E. Hall, *Gen. Man. & P. A.* Cedar Rapids, Ia.
J. S. Wattles, *Supt.* .... Missouri Valley, Ia.
C. F. McCoy, *Asst. Supt.* .... Blair, Neb.
S. A. Teal, *M. M.* .... Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B.* do.
South Carolina Ry. 5 g. 243 m. 42 lo. 685 cars.
John B. Peck, *Gen. Man.* ...... Charleston, S. C.
S. B. Pickens, *Pur. Agt.* ...... Charleston, S. C.
P. J. Cochrane, *Mast. of Mach.* Charleston, S. C.
Geo. H. Gramling, *M. C. B.* ... Charleston, S. C.
South-Eastern Ry. 4–8½ g. 161 m. 14 lo. 446 cars.
Bradley Barlow, *Gen. Man.* .... St. Albans, Vt.
P. A. McKinnon, *Supt.* .... Richford, Vt.
A. G. Eastman, *M. M.* .... Richford, Vt.
South Florida R. R. 3 gauge 40 m. 4 lo. 20 cars.
B. R. Swoope, *Supt. & P. A.* ...... Sanford, Fla.
C. C. Haskell, *Pur. Agt.* .... Sanford, Fla.
J. A. Campbell, *M. M.* .... Sanford, Fla.
A. D. Stentiford, *M. C. B.* .... Sanford, Fla.
South Mountain R. R. 4–8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt.* Pine G've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 10 lo. 260 cars.
A. H. Fracker, *Gen. Supt.* .San Francisco, Cal.
G. H. Waggoner, *Pur. Agt.* .San Francisco, Cal.
E. L. Reese, *M. M. & C. B.* ...... Newark, Cal.
South-Western R. R. (Ga.) *(See Central of Ga.)*
South-Western Ry. (Ky.) 4–8½ g. 4 m. 1 lo. 38 cars.
J. M. Wilson, *Supt.* .... Harrodsburg, Ky.
J. Tomlinson, *Pur. Agt.* ...... Harrodsburg, Ky.
Southern Central R. R. 4–8½ g. 114 m. 16 lo. 447 c.
James G. Knapp, *Supt.* .... Auburn, N. Y.
H. D. Titus, *Pur. Agt.* .... Auburn, N. Y.
Chas. G. Brown, *M. M.* .... Auburn, N. Y.
H. Mooney, *M. C. B.* .... Auburn, N. Y.
Southern Maryland R. R. 4–9 g. 47 m.
Shields Burr, *Supt.* .... Brandywine, Md.
C. J. Royce, *M. M.* .... Brandywine, Md.
Southern Pacific R. R. 4–8½ g. 161 m. 29 lo. 728 c.
Northern Div. *(For other Divs. see Cen. Pac.)*
A. C. Bassett, *Supt.* ...... San Francisco, Cal.
J. R. Watson, *Pur. Agt.* .... Sacramento, Cal.
J. T. Wilson, *M. M.* ...... San Francisco, Cal.
F. N. Bellisle, *M. C. B.* ... San Francisco, Cal.

Springfield, Effingham & So.-Eastern and
Bloomfield Rys. 3 g. 89 m.
W. C. Lyon, *Gen. Man.* .... Robinson, Ill.
E. Pratt Buell, *Pur. Agt.* .... Effingham, Ill.
J. S. Pickering, *M. M. & C. B.* .. Effingham, Ill.
Spring Hill & Parrsboro Ry. 4–8½ g. 32 m. 1 lo. 64 c.
J. Killam, *Supt.* .... Parrsboro, N. S.
K. McKinnon, *M. M.* .... Parrsboro, N. S.
St. Croix & Penobscot R. R. 4–8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt.* .Calais, Me.
G. H. Corsen, *M. M.* .... Milltown, Me.
H. C. Tincker, *M. C. B.* .... Milltown, Me.
St. John & Maine Ry. 4–8½ g. 92 m. 6 lo. 110 cars.
H. D. McLeod, *Supt. & P. Agt.* .. St. John, N. B.
A. McIntyre, *M. M.* .... St. John, N. B.
St. John's Ry. 4–8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt.* .Jacksonville, Fla.
Geo. Ferro, *M. of Mach.* .... Tocoi, Fla.
St. Johnsb'ry & Lake Champ 4–8½ g. 120 m 10 lo. 197 c.
A. B. Jewett, *Supt. & P. A.* .St. Johnsbury, Vt.
Geo. E. Howe, *M. M. & C. B.* St. Johnsbury, Vt.
St. Joseph & Des Moines R. R. *(See K. C., St. J. & C. B.)*
St. Lawrence & Ottawa Ry. 4–8½ g. 59 m. 10 l. 146 c.
Archer Baker, *Gen. Supt.* .... Ottawa, Can.
alvin Dame, *M. M. & C. B.* ... Prescott, Can.
St. Louis, Alton & Terre Haute R. R.
Main Line. *(See Ind. & St. L. Div.: Ohio Ry.)*
St. Louis & Cairo Div.: 4–8½ g 123 m. 16 lo. 778 c.
G. W. Parker, *Gen. Man.* ...... St. Louis, Mo.
J. L. Hinckley, *Supt.* .... Belleville, Ill.
A. M. De Clerq, *M. M.* .... St. Louis, Mo.
St. Louis Bridge Co. and Tunnel R. R.
4–8½ g. 17 m. 15 lo. 11 cars.
Wm. Taussig, *Gen. Man.* .... St. Louis, Mo.
A. W. Dickinson, *Supt.* .... St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt.* ... St. Louis, Mo.
H. M. Smith, *M. M.* .... St. Louis, Mo.
St. Louis Coal R. R. 4–8½ g. 28 m. 1 lo. 78 cars.
Jas. Prentice, *Supt.* .... Carbondale, Ill.
Jas. C. Bryden, *Pur. Agt.* .... St. Louis, Mo.
St. Louis, Ft. Scott & Wichita R. R. 4–8½ g. 20 miles.
F. Tiernan, *V. P. & Gen. Man.* .Fort Scott, Kan.
J. D. Hill, *Gen. Supt.* .... Fort Scott, Kan.
S. C. Young, *M. M.* .... Ft. Scott, Kan.
A. A. Lydell, *M. C. B.* .... Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4–8½ g. 59 m. 1 lo. 23 c.
W. W. Walker, *Supt.* .... Hannibal, Mo.
Geo. Douglass, *Pur. Agt.* .... Hannibal, Mo.
St. Louis, Iron Mountain & Southern Ry. (1);
International & Great Northern R. R. (2); and
Texas & Pacific Ry. (3).
4–8½ g. 2,678 m. 302 lo. 6,119 cars.
H. M. Hoxie, *Gen. Man.* .... St. Louis, Mo.
R. B. Lyle, *Gen. Pur. Agt.* ...... St. Louis, Mo.
(1) St. L., I. Mt. & So. 4–8½ g. 710 m. 137 lo. 4,081 c.
E. L. Dudley, *Supt.* .... St. Louis, Mo.
O. A. Haynes, *Supt. Mach.* .... De Soto, Mo.
Oscar Doolittle, *M. C. B.* .... St. Louis, Mo.
St. Louis Div.: J. J. Frey, *Supt.* ... St. Louis, Mo.
W. H. Harris, *M. M.* .... De Soto, Mo.
Ark. Div.: Wm. Kerrigan, *Supt.* Little Rock, Ark.
R. M. Richardson, *M. M. & C. B.* do.
(2) Inter. & Gr't No'n R. R. 4–8½ g. 776 m. 45 lo 932 c.
Jos. Herrin, *Supt.* .... Palestine, Tex.
R. H. Johnson, *M. M.* .... Palestine, Tex.
H. H. Sessions, *M. C. B.* .... Palestine, Tex.
3) Texas & Pac. Ry. 4–8½ g. 1,030 m. 120 lo. 1,106 c.
Geo. L. Sand, *Asst. Gen. Supt.* .. Marshall, Tex.
J. F. Sechler, *Gen. M. M.* .... Marshall, Tex.
H. H. Sessions, *M. C. B.* .... Marshall, Tex.
So'n Div.: Hugh Irvine, *Supt.* .... Longview, Tex.
W. Garrison, *M. M.* .... Marshall, Tex.
Tr. Con. Div.: J. L. Thorn, *Supt.* Texarkana, Ark.
Wilson Garrison, *M. M.* ...... Texarkana, Ark.
W'n Div.: Wm. Davis, *Supt.* .... Ft. Worth, Tex.
W. H. Reilly, *Asst. G. M. M.* Fort Worth, Tex.
St. L. Keokuk & No.-W'n. 4–8½ g. 187 m. 14 lo. 312 c.
J. W. Smith, *Gen. Supt. & P. Agt.* .. Keokuk, Ia.
Wm. H. Bartlett, *M. M.* .... Keokuk, Ia.
St. L., Salem & Little Rock. 4–9 g. 69 m. 5 lo. 103 c.
H. A. Crawford, *V. Pr. & P. A.* .. St. Louis, Mo.
E. B. Sankey, *Supt.* .... Salem, Mo.
Thomas Everson, *M. M.* .... Steelville, Mo.
J. W. Houston, *M. C. B.* .... Steelville, Mo.
St. L., Van. & T. H. *(See T. H. & I. Div. of Penna. Co.)*
St. Louis & Cairo R. R. 3 g. 146 m. 22 lo. 708 cars.
Chas. Hamilton, *Gen. Supt.* .... St. Louis, Mo..
R. M. Pringle, *M. M.* .... East Carondelet, Ill.
St. L. & San Fran. Ry. 4–8½ g. 695 m. 71 lo. 2,490 c.
C. W. Rogers, *2d V. Pr. & G. Man.* .St. Louis, Mo.
D. H. Nichols, *Mast. Tran.* .No. Springfield, Mo.
A. G. Thompson, *Pur. Agt.* ...... St. Louis, Mo.
M. Kearney, *M. M. & C. B.* ...... St. Louis, Mo.
Mo. & Ark. Div.: W. A. Thoms, *Supt.* do.
Kan. Div.: J. R. Wentworth, *Supt.* Neodesha, Kan.
St. Martin's & Upham Ry. 4–8½ g. 30 m. 1 lo.
A. E. Killam, *Manager* .... St. Martin's, N. B.
St. Paul, Minneapolis & Manitoba Ry.
4–8½ g. 1,050 m. 116 lo. 3,116 cars.
A. Manvel, *Gen. Man.* .... St. Paul, Minn.
H. C. Atkins, *Gen. Supt.* .... St. Paul, Minn.
E. B. Wakeman, *Supt. Trans.* .. St. Paul, Minn.
J. C. Morrison, *Pur. Agt.* .... St. Paul, Minn.
H. Middleton, *M. M. & C. B.* ... St. Paul, Minn.
Breck. Div.: A. Guthrie, *Supt.* .. St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt.* .... St. Paul, Minn.
No'n Div.: D. K. Smith, *Supt.* .... Crookston, Minn.
St. Paul & Duluth R. R. 4–8½ g. 196 m 24 lo. 580 c.
S. R. Stimson, *Gen. Supt.* ...... St. Paul, Minn.
J. G. Callahan, *Pur. Agt.* .... St. Paul, Minn.
W. McFarland, *M. M.* .... St. Paul, Minn.
John Hill, *M. C. B.* .... St. Paul, Minn.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
J. C. Missimer, *Supt.* .... Sloatsburg, N. Y.
Syracuse, Binghamton & N. Y. R. R. *(See D. L. & W.)*
Syracuse, Chenago & N. Y. 4–8½ g. 44 m. 4 lo. 60 c.
Albert Allen, *Supt.* .... Syracuse, N. Y.
George W. West, *M. M.* .... Syracuse, N. Y.
Wm. J. McMichael, *M. C. B.* ... Syracuse, N. Y.
Syracuse, Geneva & Corning; Corning, Cowanasque
& Antrim R. Rs. 4–8½ g. 121 m. 23 lo. 1,044 c.
A. H. Gorton, *Supt.* .... Corning, N. Y.
Andrew Beers, *Pur. Agt.* .... Corning, N. Y.
O. C. Patchell, *M. M.* .... Corning, N. Y.
C. J. Butler, *M. C. B.* .... Corning, N. Y.

T

Terre Haute & So.-Eastern Ry. 4–9 g. 40 miles.
Geo. Atherton, *Supt.* ...... Terre Haute, Ind.
Texas-Mexican; and Mexican National Rys.
3 g. 217 m. 19 lo. 326 cars.
G. C. Gardner, *Gen. Man.* .... New York, N. Y.
A. R. Roberts, *Pur. Agt.* .... New York, N. Y.
S. T. Fuller, *Gen. Supt.* .... Corpus Christi, Tex.
Wm. Sutcliffe, *M. M. & C. B.* do.
Mex. Nat. Ry.: J. C. Monroe, *M. M.* .Mexico, Mex
Maj. W. J. Brokaw, *M. M.* .... Manzanillo, Mex.
Texas Western Ry. 3 g. 42 m. 2 lo. 34 cars.
J. W. Goodwin, *Supt.* .... Houston, Tex.
T. F. Glispin, *M. M.* .... Houston, Tex.
Texas & New Orleans; Louisiana W'n R. Rs.
4–8½ g. 217 m. 25 lo. 900 c.
J. F. Crosby, *Gen. Man.* .... Houston, Tex.
P. B. Watson, *Pur. Agt.* .... Houston, Tex.
C. A. Burton, *Supt.* .... Houston, Tex.
D. C. Smith, *M. M.* .... Houston, Tex.
J. M. Mather, *M. C. B.* .... Houston, Tex.
Texas & St. Louis Ry. 3 g. 258 m. 15 lo. 280 cars.
J. B. Van Dyne, *Gen. Supt.* ...... Tyler, Tex.
F. W. Paramore, *Pur. Agt.* .... St. Louis, Mo.
L. B. Fisher, *Pur. Agt.* .... Tyler, Texas.
W. J. Lewis, *M. M.* .... Tyler, Tex.
Tioga and Elmira State Line R. Rs.
4–8½ and 6 g. 54 m. 17 lo. 953 cars.
L. H. Shattuck, *Supt.* .... Blossburg, Pa.
James A. Drake, *Pur. Agt.* ...... Elmira, N. Y.
Pere Bonny, *M. M.* .... Blossburg, Pa.
D. H. Stratton, *M. C. B.* .... Blossburg, Pa.
Toledo, Ann Ar. & Gr. Tr. Ry. 4–8½ g. 84 m. 7 lo. 107 c.
M. D. Woodford, *Gen. Man.* .Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt.* do
C. C. Dodge, *M. M.* .... Ann Arbor, Mich.
Toledo, Delphos & Burl. R. R. 3 g. 422 m. 21 lo. 694 c.
T. A. Phillips, *Gen. Man.* .... Toledo, O.
J. H. F. Wiers, *Supt. Mach. & P. Agt.* Toledo, O.
Tol. & Day. Div.: A. M. Matheany, *Supt.*; and
A. T. Stewart, *M. M.* .... Delphos, O.
S.-E'n Div.: R. B. Jones, *Supt.* .... Dayton, O.
F. McCreary, *M. M.* .... Dayton, O.
Tonawanda Valley R. R. 3 g. 19 m. 1 lo. 13 cars.
J. V. D. Loomis, *Supt.* .... Attica, N. Y.
Toronto, Grey & Bruce Ry. 4–8½ g. 191 m 20 lo 446 c.
Edmund Wragge, *Gen. Man.* ... Toronto, Can.
W. Watson, *Pur. Agt.* .... Toronto, Can.
David Preston, *M. M.* .... Toronto, Can.
Troy & Boston R. R. 4–8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, *Pres. & Pur. Agt.* ..... Troy, N. Y.
Joseph Crandell, *Supt.* .... Troy, N. Y.
Z. B. Davis, *M. M.* .... Troy, N. Y.
R. V. Coon, *M. C. B.* .... Troy, N. Y.
Tuckerton R. R. 4–8½ g. 31 m. 2 lo. 28 cars.
J. J. Pharo, *Supt.* .... Tuckerton, N. J.

U

Ulster & Delaware R. R. 4–8½ g. 74 m. 7 lo. 142 cars.
Jas. H. Jones, *Supt.* .... Rondout, N. Y.
Geo. W. Wright, *M. M.* .... Rondout, N. Y.
John H. Decker, *M. C. B.* .... Rondout, N. Y.
Union Pacific Ry. (4 Gen. Divs.)
3 & 4–8½ g. 4,270 m. 318 lo. 6,157 cars.
S. H. H. Clark, *Gen. Man.* .... Omaha, Neb.
Thos. L. Kimball, *Asst. Gen Man.* Omaha, Neb.
A. D. Clarke, *Pur. Agt.* .... Omaha, Neb.
(1) Union Div.: *Gen Supt.* ... Omaha, Neb.
I. H. Congdon, *Gen. M. M.* .... Omaha, Neb.
Geo. E. Stevens, *Supt. Car Dept.* Omaha, Neb.
East. Divs.: P. J. Nichols, *Supt.* .... Omaha, Neb.
Robt. McConnell, *M. M.* .... Omaha, Neb.
A. M. Collett, *M. C. B.* .... Omaha, Neb.
Jas. H. McConnell, *M. M.* .... No. Platte, Neb.
A. Reis, *For. Car. Sh.* .... No. Platte, Neb.
Mtn. Div.: Robt. Law, *Supt.* .... Cheyenne, Wy. T.
T. A. Davies, *M. M.* .... Cheyenne, Wy. T.
J. E. Davies, *For. Car. Sh.* .Cheyenne, Wy. T.
Lar. Div.: E. Dickinson, *Supt.* ... Laramie, Wy. T.
R. Galbraith, *M. M.* .... Laramie, Wy. T.
R. M. Galbraith, *M. M.* ...... Rawlins, Wy. T.
Frank Blake, *For. Car. Sh.* ... Rawlins, Wy. T.
West. Div.: W. B. Doddridge, *Supt.* Evanston, Wy T.
C. C. Quinn, *M. M.* .... Evanston, Wy. T.
R. V. Brinkley, *For. Car. Sh.* Evanston, Wy. T.
Utah Nor. Div.: G. W. Thatcher, *Supt.*, Logan, U.
R. Craft, *M. M.* .... Logan, U.
F. Reardon, *M. M.* .... Eagle Rock, Idaho.
F. M. Shoemaker, *For. Car. Sh.* Eagle R'k, Ida.
Col. Div.: A. A. Egbert, *Supt.* ..... Denver, Col.
Fred. Metzheimer, *M. M.* .... Golden Col.
E. G. Thomas, *For. Car. Sh.* ...... Golden, Col.
St. J. & W'n. Rd.: L. D. Tuthill, *Supt.* St. Joseph, Mo.
E. Sleppy, *M. M.* .... Grand Island, Neb.
E. Hansen, *For. Car. Sh.* ...... Elwood, Kan.
(2) Kansas Div.: S. T. Smith, *G. Supt.* Kansas C'y, Mo.
Jno. Mackenzie, *Supt. Mach.* Armstrong, Kan.
T. B. Roberts, *M. C. B.* .. Armstrong, Kan.
K. Val. Div.: J. O. Brinkerhoff, *Supt.* Kan. C'y, Mo.
Jas. Mackenzie, *M. M.* ...... Armstrong, Kan.
Smoky Hill & Denver Divs.:
O. H. Dorrance, *Supt.* .... Wallace, Kan.
J. B. Dailey, *M. M.* (S. H. Div.) ..... Ellis, Kan.
Chey. Div.: A. A. Egbert, *Supt.* ..... Denver, Col.
R. McDougall, *M. M.* (D. & C. Divs.) Denver, Col.
W. Ogle, *For. Car. Sh.* (D. & C. Divs.) do.
Kan. Cen. Div.: 3 g. 150 miles.
W. J. Kelley, *Supt.* ..... Leavenworth, Kan.
And. Goldthwaite, *M. M.* .Leavenworth, Kan.
F. P. Newman, *M. C. B.* .. Leavenworth, Kan.
(3) Denver & South Park Div. 3 ft. gauge 227 miles.
C. W. Fisher, *Gen. Supt.* .... Denver, Col.
J. H. Kirk, *M. M.* .... Denver, Col.
(4) Nevada Central Ry. 3 g. 93 m. 5 lo. 82 cars.
F. W. Dunn, *Supt.* .... Battle Mountain, Nev.
Z. T. Spriggs, *M. M.* ..... Battle Mountain, Nev.
United States Rolling Stock Co. 23 lo. 4,834 cars.
A. Hegewisch, *Pres.* .... New York, N. Y.
C. F. Jauriet, *Gen. M. M. & P. A.* .Chicago, Ill.
Utah Central Ry. 4–8½ g. 280 m.
John Sharp, *Gen. Supt.* .. Salt Lake City, Utah.
S. H. Hill, *Pur. Agt.* ...... Salt Lake City, Utah.
W. B. Armstrong, *M. M.* .Salt Lake City, Utah.
Peter Reid, *M. C. B.* ...... Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m
W. W. Ritter, *Gen. Man.* .. Salt Lake City, Utah.
Robert Anderson, *M. M.* .. Salt Lake City, Utah.
Utah & Pleasant Valley Ry. 60 m.
G. M. Young, *Man.* ...... Salt Lake City, Utah.
Utica, Ithaca & Elmira Ry. 4–8½ g. 127 m. 11 lo. 152 c.
G. Jas. Rice, *Pres & Supt.* Horse Heads, N. Y.
J. L. Greatsinger, *Pur. Agt.* .... Breesport, N. Y.
Geo. W. Cleveland, *M. M.* ..... Breesport, N. Y.
Wm. Ells, *M. C. B.* .... Breesport, N. Y.
Utica, & Black Riv. R. R. 4–8½ g. 180 m. 22 lo. 329 c.
J. F. Maynard, *Gen. Supt. & P. A.* .Utica, N. Y.
John Bailey, *M. M.* .... Utica, N. Y.
David James, *M. C. B.* .... Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4–8½ g. 30 m. 2 lo. 19 c.
G. B. Stevenson, *Gen. Supt.* ... Vacaville, Cal.
Valley Ry. 4–8¾ g. 59 m. 10 lo. 317 cars.
Samuel Briggs, *Supt.* .... Cleveland, O.
B. C. Bosworth, *M. M.* .... Cleveland, O.
Chas. Blanchard, *M. C. B.* ...... Cleveland, O.
ernon, Greensburg & Rushville R. R. 25 m.
Horace Scott, *V.-Pres.* ...... Greensburg, Ind.
Virginia Midland Ry. *(See Rich. & Dan.)*
Virginia & Truckee R. R. 4–8½ g. 54 m. 17 lo. 375 c.
Carson & Colorado R. R. 3 g. 150 m. 4 lo. 76 c.
H. M. Yerington, *Gen. Supt.* ...... Carson, Nev.
R. J. Laws, *Supt.* (C. & Co.) .... Carson, Nev.
C. P. Mason, *Pur. Agt.* .... Carson, Nev.
I. N. Fording, *M. M.* .... Carson, Nev.
B. F. Lyon, *M. C. B.* .... Carson, Nev.

W

Wabash, Chester & W'n R. R. 4–8½ g. 42 m. 2 lo. 32 c.
J. L. Hinckley, *Gen. Supt.* .... Chester, Ill.
Wabash, St. Louis & Pacific Ry. (3 Gen. Divs.)
4–8½ g. 3,241 m. 559 lo. 17,230 cars.
John C. Gault, *Gen. Traffic Man.* St. Louis, Mo.
Robert Andrews, *Gen. Supt.* .... St. Louis, Mo.
Asst. Gen. Supt. .... St. Louis, Mo.
R. W. Green, *Pur. Agt.* .... St. Louis, Mo.
Jacob Johann, *Gen. M. M.* ...... Springfield, Ill.
U. H. Kohler, *Gen. M. C. B.* .... Toledo, O.
(1) Eas'n Div.: J. B. Barnes, *M. M.* Fort Wayne, Ind.
U. H. Kohler, *Gen. M. C. B.* .... Toledo, O.
G. W. Stevens, *Supt.* .... Fort Wayne, Ind.
Ohio & Ind. Div.:
Peru Div.: E. C. Murphy, *Supt.* .... Peru, Ind.
John McKenna, *M. M.* .... Peru, Ind.
Cairo Div.: D. G. Moore, *Supt.* .... Cairo, Ill.
A. Van Tuyl, *M. M.* .... Carmi, Ill.
(2) Middle Div.: J. Johann, *Gen. M. M.* Springfield, Ill.
R. M. Hemphill, *M. C. B.* .... Peoria, Ill.
Ill. Div.: H. F. Clark, *Supt.* .... Springfield, Ill.
B. B. Rose, *M. C. B.* .... Decatur, Ill.
Chicago Div.: A. A. Hobart, *Supt.* .... Chicago, Ill.
Peoria Div.: F. L. Tomkins, *Supt.* ..... Peoria, Ill.
Wm. O. Hewitt, *M. M.* .... Peoria, Ill.
Rant'l Div.: B. F. Mathias, *Supt.* ..... Rantoul, Ill.
J. McCarthy, *M. M.* .... Rantoul, Ill.
(3) Western Div.: W. H. Selby, *M. M.* .. Moberly, Mo.
C. S. Buck, *M. C. B.* .... Moberly, Mo.
Missouri Div.: R. S. Miner, *Supt.* .. Moberly, Mo.
C. B. & O. Div.: J. W. Blanchard, *Supt.*; and
J. S. Hazen, *M. C. B.* .... Stanberry, Mo.
Quincy Div.: F. D. Schermerhorn, *S.* .Quincy, Ill.
Iowa Div.: E. N. Armstrong, *Supt.* ... Keokuk, Ia.
D. Moin. Div.: H. B. Skeele, *Supt.* .Des Moines, Ia.
Walla Walla & Columbia Riv. R. R. *(See Ore. Ry.)*
Walkill Ry. 4–8½ g. 117 m. 9 lo. 169 cars.
G. H. Graves, *Supt.* .... Rondout, N. Y.
J. B. Dykeman, *M. M.* .... Rondout, N. Y.
John H. Decker, *M. C. B.* .... Rondout, N. Y.
Warwick Valley R. R. 4–8½ g 28 m. 2 lo. 18 cars.
Grinnell Burt, *Pres. & Pur. Agt.* Warwick, N. Y.
S. Mills, *M. M.* .... Warwick, N. Y.
Washington & Western R. R 4–8½ g. 52 m. 5 lo. 83 c.
R. H. Havener, *Gen. Supt.* .... Alexandria, Va.
Edward Dunn, *M. M.* .... Alexandria, Va.
John Harrison, *M. C. B.* .... Alexandria, Va.
Waynesburg & Washington Rd. 3 g. 28 m. 3 lo. 15 c.
J. G. Ritchie, *Supt.* .... Waynesburg, Pa.
G. E. Huggins, *M. C. B.* .... Waynesburg, Pa.
Welland Ry. 4–8½ g. 25 m. 3 lo. 147 cars
William Pay, *Supt.* .... St. Catharines, Ont.
Jas. Taylor, *M. M.* .... St. Catharines, Ont.
Wm. H. Pay, *M. C. B.* ...... St. Catharines, Ont.
West End Narrow Gauge Ry. 3 g. 16 m.
Rolla Wells, *Supt.* .... St. Louis, Mo.
M. M. Hodgman, *M. M.* .... Florissant, Mo.
West Feliciana R. R. 4–8½ g. 27 m. 2 lo. 22 cars.
J. B. McGehee, *Pr. & Gen. Supt.* Bayou Sara, La.
J. A. Tilton, *M. M. & C. B.* ..... Bayou Sara, La.
West Virginia, Central & Pittsb'g Ry. 13 m 3 lo. 19 c.
W. E. Porter, *Gen. Supt.* ...... Piedmont, W. Va.
W. T. Blackiston, *Pur. Agt.* .... Piedmont, W. Va.
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Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 206 c.
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Robert King, *M. M.* .... Montgomery, Ala.
F. M. Wade, *M. C. B.* .... Montgomery, Ala.
Western Counties' Ry. 4–8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt.* .... Yarmouth, N. S.
Western Maryland R. R. 4–8½ g. 157 m. 16 lo. 394 c.
J. M. Hood, *Pr. & Gen. Man.* .... Baltimore, Md.
R. J. Adair, *Pur. Agt.* .... Baltimore, Md.
David Holtz, *Mast. of Mach.* Union Bridge, Md.
J. H. Nussear, *M. C. B.* ...... Union Bridge, Md.
Western No. Carolina R. R. 4–8½ g. 155 m. 6 lo. 36 c.
V. E. McBee, *Supt.* .... Salisbury, N. C.
Geo. P. Erwin, *Pur. Agt.* .... Salisbury, N. C.
G. W. Gates, *M. M.* .... Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 48 lo. 952 c.
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W. H. Day, *M. C. B.* .... Florence, S. C.
C. R. Clowe, *M. C. B.* (W. & W.). Wilmington, N. C.
Windsor & Annapolis Ry. 4–8½ g. 130 m. 10 lo. 156 c.
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Wm. Yould, *M. M.* .... Kentville, N. S.
Wm. Grierson, *M. C. B.* .... Kentville, N. S.
Wisconsin Central R. R. 4–8½ g. 480 m. 31 lo. 783 c.
F. N. Finney, *Gen. Man.* .... Milwaukee, Wis.
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J. B. Henney, *Supt. M. P. & M.* .Stevens Pt., Wis.
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Y

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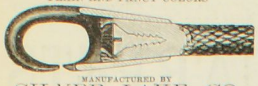

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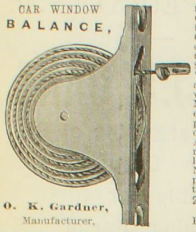

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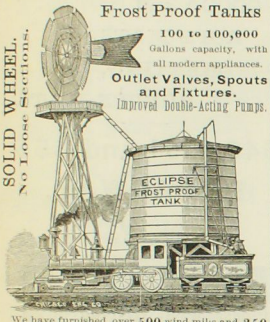

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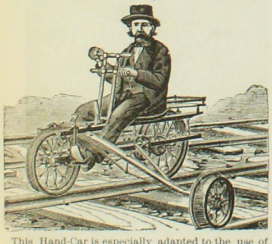

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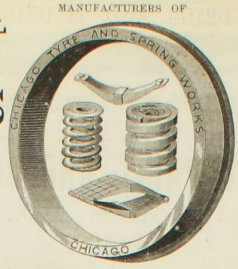

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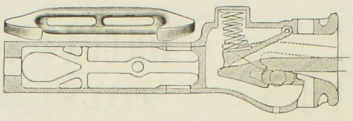

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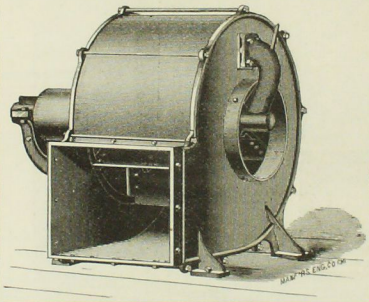

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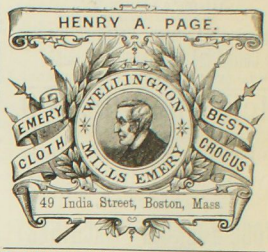

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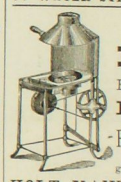

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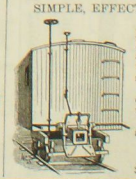

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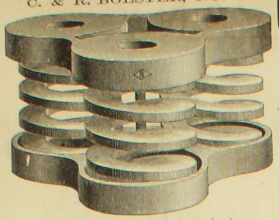

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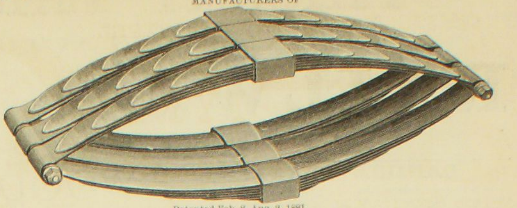

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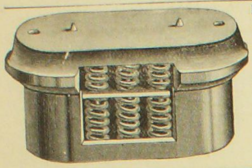

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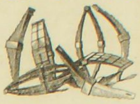

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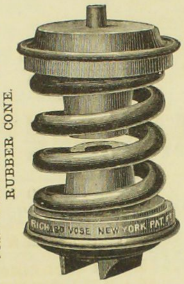

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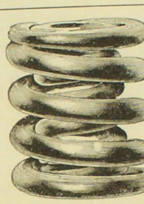

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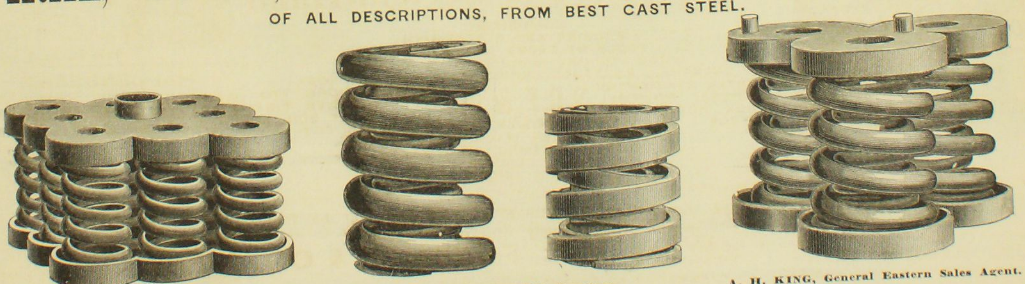

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